

3. Bitterroot Mountains Section

Section Description

The Bitterroot Mountains Section is part of the Canadian Rocky Mountain Ecoregion. The section includes habitats in Idaho and Montana. The Idaho portion of the Bitterroot Mountains includes the Coeur d'Alene, St. Joe, North Clearwater, and North Bitterroot ranges and is bounded by the Clark Fork River in the north, Lake Pend Oreille and the Palouse Prairie in the west, the Idaho–Montana border in the east, and the ridge above the Lochsa River to the south (Fig. 3.1, Fig. 3.2). The Bitterroot Mountains span from 300 to 2,414 m (984 to 7,920 ft) in elevation with the highest peaks occurring along the Idaho–Montana border within the North Bitterroot Range. Like most of the sections in north Idaho, this section is cool and temperate with an annual precipitation of 54 to 208 cm (20 to 82 in; PRISM 30-year annual precipitation) and average annual temperature that ranges from 2.6 to 9.7 °C (36.7 to 49.5 °F, PRISM 30-year annual temperature) (PRISM Climate Group 2012). Precipitation occurs mostly as snow from November to March, while summers are dry.

The mountain ranges that compose the Bitterroot Mountains Section vary from the lower rolling peaks of the Coeur d'Alene Range to the higher, steeply dissected peaks of the North Bitterroot and North Clearwater Mountain ranges. The topology of the different ranges reflect the different underlying

mechanisms responsible in their formation with the lower Coeur d'Alene and St. Joe mountains remaining unglaciated and the higher North Bitterroot and North Clearwater carved by alpine glaciers. The section has a maritime-influenced climate that delivers moisture-laden air currents in the fall, winter, and spring in the form of heavy snowfall and warmer winter temperatures. On the other hand, summers are hot and dry, with some areas reaching temperatures of around 38 °C (100 °F).



Coeur d'Alene Mountains © Michael Lucid

The section is predominantly forested with dense and diverse stands of subalpine fir (*Abies lasiocarpa* [Hook.] Nutt.), Douglas-fir (*Pseudotsuga menziesii* [Mirb.] Franco), grand fir (*Abies grandis* [Douglas ex D. Don] Lindl.) and western redcedar (*Thuja plicata* Donn ex D. Don). Western white pine (*Pinus monticola* Douglas ex D. Don) was a prominent tree within these forests but the advent of the white pine blister rust (*Cronartium ribicola*), of which the pine has limited resistance, has nearly eliminated this species' presence on the landscape. Whitebark pine (*Pinus albicaulis* Engelm.) was another key component of the subalpine habitats but Mountain Pine Beetle (*Dendroctonus ponderosae*) and white pine blister rust have impacted this species as well. Wildlife species in this section are characteristic of the Northern Rockies and include Clark's Nutcracker (*Nucifraga columbiana*), Wolverine (*Gulo gulo*), and Mountain Goat (*Oreamnos americanus*) in subalpine habitats and Olive-sided Flycatcher (*Contopus cooperi*) and Fisher (*Pekania pennanti*) in mesic montane habitats.

Although the higher elevations of the North Bitterroot and North Clearwater ranges were carved by mountain glaciers, the lower portions of the ranges were unaffected by glaciation. This preserved the steep v-shaped canyons at lower elevations and provided a refugium for coastal species and an environment for the evolution of endemic plants. The maritime climate of this section continues to provide the mild temperatures and heavy precipitation necessary for nearly 40 species of disjunct populations of coastal plants identified in the lower canyons of the North Fork Clearwater, Selway, and Lochsa rivers. Examples of plants characteristic of the canyon habitats include red alder (*Alnus rubra* Bong.), deer fern (*Blechnum spicant* [L.] Sm.), Sierra marsh fern (*Thelypteris nevadensis* [Baker] Clute ex Morton), North Idaho monkeyflower (*Mimulus clivicola* Greenm.), and Constance's bittercress (*Cardamine constancei* Detling), which is a regional endemic. In addition, the canyon habitat harbors several species of beetles and earthworms that are endemic to Idaho. However, the filling of the Dworshak Reservoir inundated much of this habitat and it has been further impacted by the construction of roads, campgrounds, and administrative sites.

The Coeur d'Alene, St. Joe, St. Maries, and North Fork Clearwater rivers compose the major waterways of the Bitterroot Mountains Section. Three of these (Coeur d'Alene, St. Joe, and St. Maries) are major tributaries of the Spokane River drainage and feed into Lake Coeur d'Alene, the largest natural lake in the section. The floodplains of these rivers and their tributaries support diverse riparian forests and shrublands, as well as extensive marshes found in oxbows, meanders, and other low lying depressions. Although nearly 106 km (66 mi) of the upper St. Joe River is nationally designated as wild and scenic, most of the Spokane River drainage, including the St. Maries and Coeur d'Alene rivers and their associated wetlands, has been impacted by a long history of heavy metal pollution, sedimentation, and stream channelization. Numerous lowland lakes, waterfalls, wetlands, and mountain lakes in these drainages provide important nesting and migration stopover habitats for waterfowl, Neotropical migrants, colonial and semicolonial waterbirds such as Black Tern (*Chlidonias niger*).

The stunning beauty of Lake Coeur d'Alene and its proximity to the cities of Coeur d'Alene, the largest population center in the section, and Spokane, Washington, make it a popular tourist destination. Boating, angling, wildlife watching, and specifically winter eagle watching are common activities. Local economies benefit through fees paid on recreational activities such as hunting, fishing, boating, and snowmobiling and taxes paid on associated gear. Camping, hiking, wildlife watching, and biking are also popular outdoor



Black Tern, IDFG

activities in the region. Outside of Coeur d'Alene, most of the section's population is dispersed and rural. Towns are generally located along rivers. Wetlands of the lower Coeur d'Alene River valley are among the most important and valued in the state. This section is noted for its long and storied mining heritage (primarily for gold, silver, lead, and zinc), particularly the Coeur d'Alene Mountains and Silver Valley east of Coeur d'Alene where metal extraction continues today. Forestry and localized grazing are also important land uses within the section.

Spotlight Species of Greatest Conservation Need: Clearwater Roachfly (*Soliperla salish*)

Although this small mayfly has an unattractive name, it is found in a beautiful habitat—the splash zones of high-elevation headwater stream waterfalls. It is believed to be endemic to the Clearwater Basin and is only known from a few sites. Considering how difficult it is to access its unique habitat sites, this species is likely undersampled and likely occurs at more sites than we are currently aware of (D. Gustafson pers. comm.). This species is representative of the high levels of endemism found in the Bitterroot Mountains Section and emblematic of a cold-adapted and understudied species that we strive to understand more completely in our rapidly changing world.

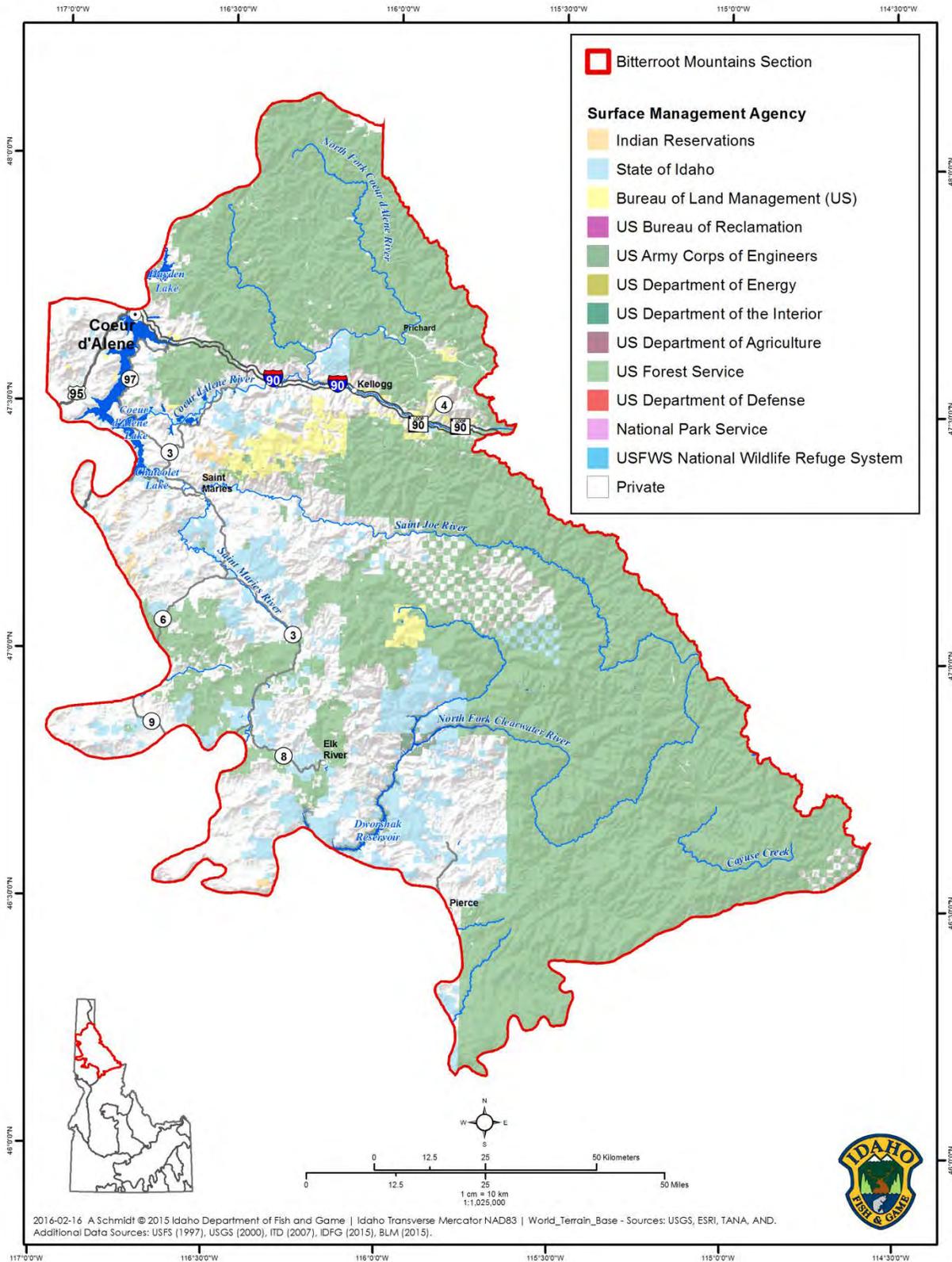


Fig. 3.1 Map of Bitterroot Mountains surface management

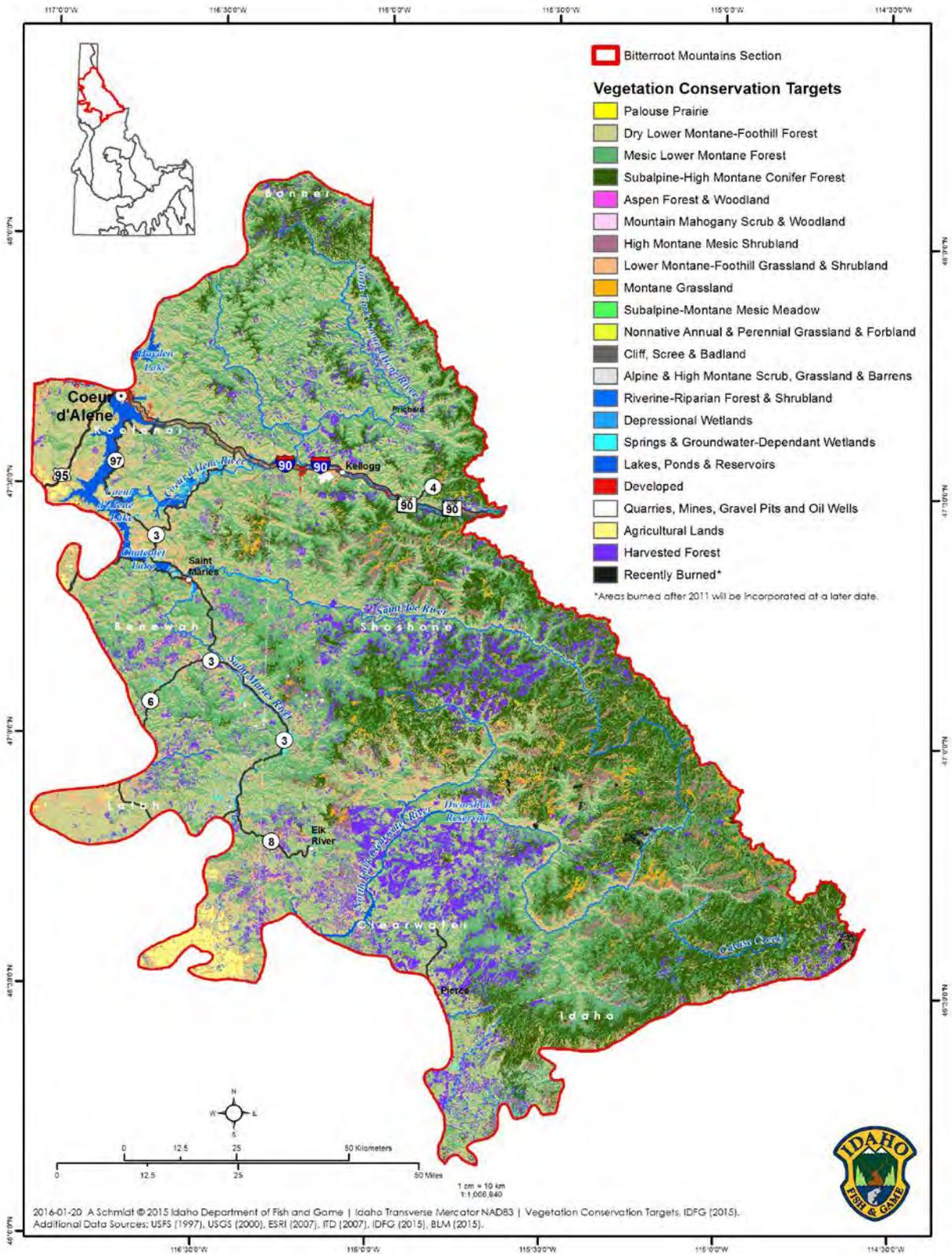


Fig. 3.2 Map of Bitterroot Mountains vegetation conservation targets

Conservation Targets in the Bitterroot Mountains

We selected 6 habitat targets (3 upland, 3 aquatic) that represent the major ecosystems in the Bitterroot Mountains as shown in Table 3.1. Each of these systems provides habitat for key species of greatest conservation need (SGCN), i.e., “nested targets” (Table 3.2). All SGCN management programs in the Bitterroot Mountains have a nexus with habitat management programs. Conservation of the habitat targets listed below should conserve most of the nested species within them. However, we determined that 6 taxonomic groups (Lake-Nesting Birds, Ground-Dwelling Invertebrates, Pond-Breeding Amphibians, Low-Density Forest Carnivores, Pollinators, and Bat Assemblage) have special conservation needs and thus are presented as explicit species targets as shown in Table 3.1.

Table 3.1 At-a-glance table of conservation targets in the Bitterroot Mountains

Target	Target description	Target viability	Nested targets (SGCN)	
Dry Lower Montane-Foothill Forest	Northern Rocky Mts. Douglas-fir and ponderosa pine woodland and savannah systems at lower elevation forests in the Coeur d'Alene, St. Joe, North Bitterroot, and North Clearwater mountains.	<i>Fair.</i> Substantial encroachment by other habitat types due to lack of natural fire cycle; improper off-highway vehicle use, invasive species, and insects/disease are other stressors.	<i>Tier 2</i>	Lewis's Woodpecker Silver-haired Bat Hoary Bat
			<i>Tier 3</i>	Common Nighthawk Olive-sided Flycatcher Townsend's Big-eared Bat Little Brown Myotis
Mesic Lower Montane Forest	Commonly referred to as “cedar-hemlock” but also includes grand fir and aspen-mixed conifer forest at lower elevations in the Coeur d'Alene, St. Joe, North Bitterroot, and North Clearwater mountains.	<i>Fair.</i> Altered stand composition and structure due to lack of natural fire cycle and loss of western white pine; fragmented by forest management.	<i>Tier 2</i>	Silver-haired Bat Hoary Bat Fisher
			<i>Tier 3</i>	Olive-sided Flycatcher Townsend's Big-eared Bat Little Brown Myotis
Subalpine-High Montane Conifer Forest	Engelmann spruce-subalpine fir-mountain hemlock forest and whitebark pine woodlands at higher elevations in the Coeur d'Alene, St. Joe, North Bitterroot, and North Clearwater mountains.	<i>Poor to Fair.</i> Subject to altered fire regimes, forest insects, disease, and climate change; reduction in whitebark pine woodlands.	<i>Tier 1</i>	Wolverine Magnum Mantleslug
			<i>Tier 2</i>	Western Toad
			<i>Tier 3</i>	Clark's Nutcracker Mountain Goat Hoary Marmot Pale Jumping-slug
Riverine-Riparian Forest & Shrubland	Rivers and streams, including aquatic habitats and their associated terrestrial riparian habitats. Includes Coeur d'Alene, St. Joe, St. Maries, and Clearwater rivers and tributaries.	<i>Fair.</i> Riverine systems in the lower valleys impacted by hydroelectric operations, pollution from mining, and invasive species. Higher elevation headwaters threatened by climate change.	<i>Tier 1</i>	Pacific Lamprey A Click Beetle (<i>Beckerus barri</i>)
			<i>Tier 2</i>	Harlequin Duck Black Swift Western Pearlshell Rocky Mountain Dusksnail A Riffle Beetle (<i>Bryelmis idahoensis</i>) Lolo Mayfly A Mayfly (<i>Ephemerella</i>)

Target	Target description	Target viability	Nested targets (SGCN)
			<i>alleni</i>
			Tier 3 Rotund Physa A Mayfly (<i>Ameletus tolae</i>) A Mayfly (<i>Paraleptophlebia falcula</i>) A Mayfly (<i>Parameletus columbiae</i>) Straight Snowfly Idaho Snowfly Palouse Snowfly Clearwater Roachfly Umatilla Willowfly A Caddisfly (<i>Manophylax annulatus</i>) A Caddisfly (<i>Eocosmoecus schmidi</i>) A Caddisfly (<i>Homophylax acutus</i>) A Caddisfly (<i>Philocasca antennata</i>) A Caddisfly (<i>Philocasca banksi</i>) A Caddisfly (<i>Rhyacophila oreia</i>) A Caddisfly (<i>Rhyacophila robusta</i>) A Caddisfly (<i>Goereilla baumanni</i>) A Caddisfly (<i>Sericostriata surdickae</i>)
Depressional Wetlands	Surface water-fed systems ranging from infrequent to semipermanent or permanently flooded. Typically pond sized or smaller. Includes vernal pools and most marshes.	<i>Fair</i> . Lower elevations experiencing altered hydrologic regimes, pollution from mining, and invasive species/disease. Higher elevations threatened by climate change.	Tier 2 Western Toad American Bittern Black Tern Silver-haired Bat Tier 3 Townsend's Big-eared Bat Little Brown Myotis
Springs & Groundwater-Dependent Wetlands	Includes a subset of groundwater-dependent ecosystems such as springs, seeps, fens, and wet and mesic meadows.	<i>Fair</i> . Lower elevations experiencing altered hydrologic regimes, mining pollution, and invasive species/disease. Higher elevations threatened by climate change.	Tier 1 A Click Beetle (<i>Beckerus barri</i>) Tier 2 Western Toad Rocky Mountain Dusksnail Pristine Pyrg Tier 3 Cascades Needlefly Idaho Forestfly Clearwater Roachfly

Target	Target description	Target viability	Nested targets (SGCN)	
Pond-Breeding Amphibians	Amphibians and reptiles that primarily breed in lentic wetlands.	<i>Poor.</i> Many amphibians face invasive species/disease threats. Possible severe population declines.	<i>Tier 2</i>	Western Toad Northern Leopard Frog
Lake-Nesting Birds	Western Grebe is listed as an Intermountain West Waterbird Conservation Plan priority species due to habitat concerns and impacts from recreational boating.	<i>Good.</i> Colony has consistently numbered between 20 and 80 nests. Occasionally contains nesting Clark's Grebe.	<i>Tier 2</i>	Western Grebe
Bat Assemblage	Several bat species occur across habitats within the section.	<i>Fair.</i> Roost locations are impacted by human disturbance and AML closures. Threat of white-nose syndrome imminent.	<i>Tier 2</i>	Silver-haired Bat Hoary Bat
Low-Density Forest Carnivores	Wide-ranging mammalian mesocarnivores.	<i>Poor to Fair.</i> Only a few Wolverines known to occur in section. Bitterroot Mountains is core habitat for Fisher.	<i>Tier 1</i>	Wolverine
			<i>Tier 2</i>	Fisher
Ground-Dwelling Invertebrates	Assemblage of terrestrial invertebrates found on forest and other habitat floors.	<i>Good.</i> Habitat and threat data deficient. Many species taxonomically and distributionally data deficient.	<i>Tier 1</i>	Marbled Jumping-slug Magnum Mantleslug Blue-gray Taildropper Papillose Taildropper Rocky Mountain Axetail Selway Forestsnail Mission Creek Oregonian Kingston Oregonian
Pollinators	Species delivering pollination ecosystem services.	<i>Fair.</i> Many pollinators declining rangewide.	<i>Tier 1</i>	Morrison's Bumble Bee Western Bumble Bee Suckley's Cuckoo Bumble Bee
			<i>Tier 3</i>	A Miner Bee (<i>Andrena aculeata</i>) A Miner Bee (<i>Perdita salicis euxantha</i>) Hunt's Bumble Bee

Target	Target description	Target viability	Nested targets (SGCN)
			A Mason Bee (<i>Hoplitis orthognathus</i>) Monarch Gillette's Checkerspot

Table 3.2 Species of greatest conservation need (SGCN) and associated conservation targets in the Bitterroot Mountains

Taxon	Conservation targets											
	Dry Lower Montane-Foothill Forest	Mesic Lower Montane Forest	Subalpine-High Montane Conifer Forest	Riverine-Riparian Forest & Shrubland	Depressional Wetlands	Springs & Groundwater-Dependent Wetlands	Pond-Breeding Amphibians	Lake-Nesting Birds	Bat Assemblage	Low-Density Forest Carnivores	Ground-Dwelling Invertebrates	Pollinators
LAMPREYS												
Pacific Lamprey (<i>Entosphenus tridentatus</i>) ¹				X								
AMPHIBIANS												
Western Toad (<i>Anaxyrus boreas</i>) ²			X		X	X	X					
Northern Leopard Frog (<i>Lithobates pipiens</i>) ²							X					
BIRDS												
Harlequin Duck (<i>Histrionicus histrionicus</i>) ²				X								
Western Grebe (<i>Aechmophorus occidentalis</i>) ²								X				
American Bittern (<i>Botaurus lentiginosus</i>) ²					X							
Black Tern (<i>Chlidonias niger</i>) ²					X							
Common Nighthawk (<i>Chordeiles minor</i>) ³	X											
Black Swift (<i>Cypseloides niger</i>) ²				X								
Lewis's Woodpecker (<i>Melanerpes lewis</i>) ²	X											
Olive-sided Flycatcher (<i>Contopus cooperi</i>) ³	X	X										
Clark's Nutcracker (<i>Nucifraga columbiana</i>) ³			X									
MAMMALS												
Townsend's Big-eared Bat (<i>Corynorhinus townsendii</i>) ³	X	X			X				X			
Silver-haired Bat (<i>Lasionycteris noctivagans</i>) ²	X	X			X				X			
Hoary Bat (<i>Lasiurus cinereus</i>) ²	X	X							X			
Little Brown Myotis (<i>Myotis lucifugus</i>) ³	X	X			X				X			
Wolverine (<i>Gulo gulo</i>) ¹			X							X		
Fisher (<i>Pekania pennanti</i>) ²		X								X		
Mountain Goat (<i>Oreamnos americanus</i>) ³			X									
Hoary Marmot (<i>Marmota caligata</i>) ³			X									
ARACHNIDS												
Harvestman (<i>Acuclavella</i>) Species Group ³											X	
BIVALVES												
Western Pearlshell (<i>Margaritifera falcata</i>) ²				X								
AQUATIC GASTROPODS												
Rotund Physa (<i>Physella columbiana</i>) ³				X								

Taxon	Conservation targets											
	Dry Lower Montane–Foothill Forest	Mesic Lower Montane Forest	Subalpine–High Montane Conifer Forest	Riverine–Riparian Forest & Shrubland	Depressional Wetlands	Springs & Groundwater-Dependent Wetlands	Pond-Breeding Amphibians	Lake-Nesting Birds	Bat Assemblage	Low-Density Forest Carnivores	Ground-Dwelling Invertebrates	Pollinators
Rocky Mountain Dusksnail (<i>Colligyrus greggi</i>) ²				X		X						
Pristine Pyrg (<i>Pristinicola hemphilli</i>) ²						X						
TERRESTRIAL GASTROPODS												
Pale Jumping-slug (<i>Hemphillia camelus</i>) ³			X								X	
Marbled Jumping-slug (<i>Hemphillia danielsi</i>) ¹											X	
Magnum Mantleslug (<i>Magnipelta mycophaga</i>) ¹			X								X	
Blue-gray Taildropper (<i>Prophysaon coeruleum</i>) ¹											X	
Papillose Taildropper (<i>Prophysaon dubium</i>) ¹											X	
Rocky Mountain Axetail (<i>Securicauda hermani</i>) ¹											X	
Nimapuna Disc (<i>Anguispira nimapuna</i>) ³											X	
Salmon Coil (<i>Helicodiscus salmonaceus</i>) ³											X	
Selway Forestsnail (<i>Allogona lombardii</i>) ¹											X	
Mission Creek Oregonian (<i>Cryptomastix magnidentata</i>) ¹											X	
Coeur d'Alene Oregonian (<i>Cryptomastix mullani</i>) ³											X	
Kingston Oregonian (<i>Cryptomastix sanburni</i>) ¹											X	
Shiny Tightcoil (<i>Pristiloma wascoense</i>) ³											X	
INSECTS												
A Click Beetle (<i>Beckerus barri</i>) ¹				X		X						
A Riffle Beetle (<i>Bryelmis idahoensis</i>) ²				X								
A Mayfly (<i>Ameletus tolae</i>) ³				X								
Lolo Mayfly (<i>Caurinella idahoensis</i>) ²				X								
A Mayfly (<i>Ephemerella alleni</i>) ²				X								
A Mayfly (<i>Paraleptophlebia falcula</i>) ³				X								
A Mayfly (<i>Parameletus columbiae</i>) ³				X								
A Miner Bee (<i>Andrena aculeata</i>) ³												X
A Miner Bee (<i>Perdita salicis euxantha</i>) ³												X
Hunt's Bumble Bee (<i>Bombus huntii</i>) ³												X
Morrison's Bumble Bee (<i>Bombus morrisoni</i>) ¹												X
Western Bumble Bee (<i>Bombus occidentalis</i>) ¹												X
Suckley's Cuckoo Bumble Bee (<i>Bombus suckleyi</i>) ¹												X

Taxon	Conservation targets											
	Dry Lower Montane–Foothill Forest	Mesic Lower Montane Forest	Subalpine–High Montane Conifer Forest	Riverine–Riparian Forest & Shrubland	Depressional Wetlands	Springs & Groundwater-Dependent Wetlands	Pond-Breeding Amphibians	Lake-Nesting Birds	Bat Assemblage	Low-Density Forest Carnivores	Ground-Dwelling Invertebrates	Pollinators
A Mason Bee (<i>Hoplitis orthognathus</i>) ³												X
Monarch (<i>Danaus plexippus</i>) ³												X
Gillette's Checkerspot (<i>Euphydryas gillettii</i>) ³												X
Spur-throated Grasshopper (<i>Melanoplus</i>) Species Group ³											X	
Straight Snowfly (<i>Capnia lineata</i>) ³				X								
Idaho Snowfly (<i>Capnia zukeli</i>) ³				X								
Palouse Snowfly (<i>Isocapnia palousa</i>) ³				X								
Cascades Needlefly (<i>Megaleuctra kincaidii</i>) ³						X						
Idaho Forestfly (<i>Soyedina potteri</i>) ³						X						
Clearwater Roachfly (<i>Soliperla salish</i>) ³				X		X						
Umatilla Willowfly (<i>Taenionema umatilla</i>) ³				X								
A Caddisfly (<i>Manophylax annulatus</i>) ³				X								
A Caddisfly (<i>Eocosmoecus schmidii</i>) ³				X								
A Caddisfly (<i>Philocasca antennata</i>) ³				X								
A Caddisfly (<i>Philocasca banksi</i>) ³				X								
A Caddisfly (<i>Homophylax acutus</i>) ³				X								
A Caddisfly (<i>Rhyacophila oreia</i>) ³				X								
A Caddisfly (<i>Rhyacophila robusta</i>) ³				X								
A Caddisfly (<i>Goereilla baumanni</i>) ³				X								
A Caddisfly (<i>Sericostriata surdickae</i>) ³				X								

Target: Dry Lower Montane–Foothill Forest

In the Bitterroot Mountains, nearly 27% of the land cover is classified as Dry Lower Montane–Foothill Forest. Although this habitat group can be located at all aspects and slopes, it is predominantly found on warm-dry, south-southwest, and moderately steep slopes within the Coeur d'Alene, St. Joe, North Bitterroot and North Clearwater mountains (Cooper et al. 1991). It also extends into

the valleys and floodplains that surround the mountain ranges. Elevations typically range from 300 to 1,920 m (984 to 6,300 ft) in the Bitterroot Mountains, although there are numerous occurrences at higher elevations.



Douglas-fir is a codominant climax species with

Dry Lower Montane–Foothill Forest © Amanda DeLima

ponderosa pine (*Pinus ponderosa* Lawson & C. Lawson) in mixed or single species stands (Rocchio 2011). Species such as lodgepole pine (*Pinus contorta* Douglas ex Loudon), western larch (*Larix occidentalis* Nutt.), and grand fir only occasionally occur and are found in the wetter microsites (Cooper et al. 1991). Ponderosa pine woodlands are dominant on the driest sites where fires are frequent and of low severity (Cooper et al. 1991). Historically, fires were thought to be frequent and moderate- to low-severity, which maintained open stands of fire-resistant species. Low fire frequency has resulted in a dominance of shrubs and tree species such as grand fir and Douglas-fir in the understory. Currently, the habitat group contains a variable understory physiognomy ranging from shrub-dominated and dense, with mallow ninebark (*Physocarpus malvaceus* [Greene] Kuntze) and oceanspray (*Holodiscus discolor* [Pursh] Maxim.), to bunchgrass-dominated and open, with Idaho Idaho fescue (*Festuca idahoensis* Elmer) and bluebunch wheatgrass bluebunch wheatgrass (*Pseudoroegneria spicata* [Pursh] Á. Löve).

Target Viability

Fair. There has been substantial encroachment in the habitat type by more shade-tolerant overstory species due to the lack of normal fire intervals. Forest management and development (e.g., housing, roads) have also altered stands.

Prioritized Threats and Strategies for Dry Lower Montane–Foothill Forest

Very High rated threats to Dry Lower Montane–Foothill Forest in the Bitterroot Mountains

Altered fire regimes (fire suppression & stand-replacing wildfires)

Historically, moderate- to low-severity fires burned, on average, every 10 to 30 years. Fires maintained the open understory and predominance of shade-intolerant species such as ponderosa pine in the overstory (Smith and Fischer 1997). However, decades of aggressive fire suppression, aided by a cool period in the Pacific decadal oscillation, were effective in preventing most moderate-severity and stand-replacing fires and enabled shade-intolerant species to establish and heavy fuel loads to build (USFS 2013a). This resulted in the encroachment of shade-tolerant species into the habitat group and a decrease in fire-tolerant species, alongside increased vertical stand structure, canopy closure, vertical fuel ladders, fire intensity and severity, and insect and disease epidemics (Keane et al. 2002). Fire management activities over the past 15 years have attempted to simulate and reestablish the vegetative composition of regular fire patterns, but are hampered by policy that does not allow natural fires to burn. Additionally, population increases in neighboring towns has increased the Wildland–Urban Interface (WUI) that often prevents the use of fire as a management tool.

Objective	Strategy	Action(s)	Target SGCNs
Restore a natural fire interval that promotes historical forest conditions (USFS 2013b [monitoring and evaluation program]).	Use prescribed and natural fires to maintain desired conditions (USFS 2015).	<p>Reduce fuels through mechanical removal or controlled burns on lands within the WUI (USFS 2015).</p> <p>Leave fire-killed trees standing as wildlife habitat if they pose no safety hazard (USFS 2015).</p> <p>Remove perceived barriers to allow more prescribed natural fire on state and private forest lands.</p> <p>Promote/facilitate the use of prescribed fire as a habitat restoration tool, on both public and private lands where appropriate.</p> <p>Increase membership and participation in Idaho Forest Stewardship Programs, American Tree Farm System, and NRCS.</p>	<p>Common Nighthawk</p> <p>Lewis's Woodpecker</p> <p>Olive-sided Flycatcher</p> <p>Townsend's Big-eared Bat</p> <p>Silver-haired Bat</p> <p>Hoary Bat</p> <p>Little Brown Myotis</p>
Simulate natural fire regimes.	Design and implement silvicultural prescriptions that simulate natural disturbance regimes.	<p>Actively remove shade-tolerant species.</p> <p>Increase markets to pay for ecological forest management activities, e.g., explore markets to thin trees so that they can ward off fire and insect threats.</p>	<p>Common Nighthawk</p> <p>Lewis's Woodpecker</p> <p>Olive-sided Flycatcher</p> <p>Townsend's Big-eared Bat</p> <p>Silver-haired Bat</p> <p>Hoary Bat</p> <p>Little Brown Myotis</p>

OHV use in undesignated areas

Considered a critical issue on state, industrial, and private lands as well as one of the US Forest Service's (FS) "four threats" (<http://www.fs.fed.us/projects/four-threats/>), pressure from Off Highway Vehicle (OHV) use can lead to the degradation of forested areas. Such use can increase erosion, user conflicts, spread of invasive species, damage to cultural sites, disturbance to wildlife, destruction of wildlife habitat, and risks to public safety. In the Idaho Panhandle National Forest (IPNF), there are over 6,920 km (4,300 mi) of roads and trails available for OHV use. Visitors to the IPNF often cite the ability to use OHVs on forest roads and trails as the primary reason for their visit (Cook and O'Laughlin 2008). It is a desired condition within the 2015 Forest Management Plan that motorized recreational opportunities at the levels designated in the plan continues within the forest (USFS 2015). However, in the IPNF and the adjacent Clearwater National Forest, there is evidence of unauthorized motorized used through the damage done to natural resources. Additionally, violations associated with OHV use are continuously in the triple digits (USFS 2013b). Unauthorized motorized use impacts soil and vegetation resources through the disruption or compaction of soil and the damage or removal of vegetation (Cook and O'Laughlin 2008). Wildlife may also be impacted through noise and disturbance. The severity of the impacts is dependent on the habitat and the associated wildlife (Cook and O'Laughlin 2008). Whether damage is intentional or unintentional, restoration efforts in areas damaged by OHV use often costs in the millions of dollars statewide (Cook and O'Laughlin 2008). However, during a survey of OHV users in Idaho, more than half of OHV users saw little to no impact on natural resources via off-trail/off-road vehicle use (Cook and O'Laughlin 2008).

Objective	Strategy	Action(s)	Target SGCNs
Minimize wildlife, soil, vegetation, and hydrologic disturbances from unauthorized off-trail/off-road motorized use.	Create and maintain OHV use areas.	Update Travel Management Plans on public lands. Create and maintain designated OHV use areas. Make sensitive sites more difficult to access while providing facilities and trails in other areas (Cook and O'Laughlin 2008).	
	Educate OHV users about potential resource impacts.	Provide education materials at vehicle registration sites and through other media outlets. Increase signage at closed roads/trails to prevent unintentional travel. Increase signage at vulnerable locations on OHV impacts.	
	Increase enforcement of unintentional travel.	Increase the severity penalties for OHV violations. Incentivize reporting violations. For example, Backcountry Hunters & Anglers provide monetary rewards for reporting OHVs behind closed gates.	

High rated threats to Dry Lower Montane–Foothill Forest in the Bitterroot Mountains

Noxious weeds

In the drier habitat types such as the Dry Lower Montane–Foothill Forest, invasive and noxious weeds have migrated from disturbed areas such as roads, railroads, and utility right-of-ways to undisturbed habitats. Across the IPNF, nearly 82% of the warm/dry habitat type is at high risk for invasion by nonnative weeds (USFS et al. 2013). In addition, surveys done in the Bitterroot Mountains found 5% of sites in the Dry Lower Montane–Foothill Forest type ($n = 123$) had spotted knapweed (*Centaurea stoebe* L.) or common tansy (*Tanacetum vulgare* L.) present (Lucid et al. 2016). Species such as spotted knapweed, diffuse knapweed (*Centaurea diffusa* Lam.), yellow star-thistle (*Centaurea solstitialis* L.), leafy spurge (*Euphorbia esula* L.), and Dyer's woad (*Isatis tinctoria* L.) are particularly invasive within the IPNF and have dispersed into undisturbed areas and displaced native species over large areas (USFS et al. 2013).

Objective	Strategy	Action(s)	Target SGCNs
Identify and eradicate any potential invasive species prior to establishment (USFS 2013a).	<p>Coordinate invasive and noxious weed monitoring and treatment across agencies.</p> <p>Implement the Idaho Invasive Species Council Strategic Plan.</p>	<p>Train agency staff to document presence/absence of noxious weeds during field/site visits.</p> <p>Develop a noxious weed database for all lands across Idaho. Use existing Global Positioning Systems (GPS), remote sensing, and Geographic Information Systems (GIS) technologies to efficiently collect, store, retrieve, analyze, and display noxious weed information (ISDA 1999).</p> <p>Implement actions described in the 2012–2016 Idaho Invasive Species Strategic Plan (ISDA 2012).</p>	<p>Common Nighthawk</p> <p>Olive-sided Flycatcher</p> <p>Townsend's Big-eared Bat</p> <p>Silver-haired Bat</p> <p>Hoary Bat</p> <p>Little Brown Myotis</p>
Contain and reduce widespread weeds in areas that are already infested (USFS 2013a).	<p>Coordinate invasive and noxious weed monitoring and treatment across agencies.</p> <p>Identify and treat dispersal vectors to prevent further spread of invasive and noxious weeds.</p> <p>Restore treated areas with native species.</p>	<p>Treat weeds in high impact areas and along roads (USFS 2013a).</p> <p>Treat equipment used during timber harvest or fire suppression activities to be "weed-free" (USFS 2013a, IDL 2015).</p> <p>Revegetate treatment areas with native species and monitor restoration (KTOI 2009).</p> <p>Implement actions described in the 2012–2016 Idaho Invasive Species Strategic Plan (ISDA 2012).</p> <p>Incorporate noxious weeds into a multitaxa monitoring program.</p>	<p>Common Nighthawk</p> <p>Olive-sided Flycatcher</p> <p>Townsend's Big-eared Bat</p> <p>Silver-haired Bat</p> <p>Hoary Bat</p> <p>Little Brown Myotis</p>

Medium rated threats to Dry Lower Montane–Foothill Forest in the Bitterroot Mountains

Forest insect pests & diseases

The Idaho Forest Action Plan (Idaho Department of Lands 2010, rev. May 2012) scores this threat as "High" and considers Mountain Pine Beetle the most serious forest pest problem in Idaho, considered equal in importance to the combination of all other forest health sub-issues. However, when taking scope and severity of threat into consideration, the scope of this threat in the Bitterroot Mountains is not as pervasive as in other sections of the state, and therefore we consider the overall threat impact as medium in this section. Beetle infestations are a natural part of the system so in this plan, we focus on stand-replacing outbreaks as the problem. In addition, forest diseases such as root rot (e.g., *Armillaria*), mistletoe, and stem rot also result in tree mortality.

Objective	Strategy	Action(s)	Target SGCNs
Reduce risk of stand-replacing pine beetle or root fungus infestations.	<p>Use integrative pest management strategies.</p> <p>Increase diversity of stand ages, size classes and tree species (KPNZ Climate et al. 2010).</p> <p>Promote responsible firewood harvest/transport.</p>	<p>Use pheromones to protect stands (beetle whispering) (Kegley and Gibson 2004).</p> <p>Target removal of diseased and appropriate size class trees.</p> <p>Remove debris that attracts pine beetles.</p> <p>Cut out or girdle mistletoe-infected trees (IDL 2015).</p>	

Species designation, planning & monitoring

Multiple species identified as SGCN found in the Dry Lower Montane–Foothill Forest are declining as a result of unknown causes. The priority for these species in the coming years is to identify the root causes and to develop strategies to address them.

Objective	Strategy	Action(s)	Target SGCNs
Determine causes of decline for nightjar species in Idaho.	Work with Western Working Group Partners in Flight (WWG PIF) and the Pacific Flyway Nongame Technical Committee (PFNTC) to assess causes(s) of decline.	<p>Assist WWG PIF with adjusting current Nightjar Survey Network protocols to collect data that will inform potential cause(s) of decline, including assessments of insect prey populations and their habitats.</p> <p>Work with WWG PIF and PFNTC to identify opportunities for research on contaminant impacts.</p>	Common Nighthawk
Determine causes of decline in Olive-sided Flycatcher.	Determine relative importance of known and suspected threats to Olive-sided	Promote cooperation and collaboration with WWG PIF to fill knowledge gaps and to mitigate threats.	Olive-sided Flycatcher

Objective	Strategy	Action(s)	Target SGCNs
	<p>Flycatcher, its prey, and its habitats (see Canada's recovery plan, Appendix B; Environment Canada 2015b).</p> <p>Investigate factors affecting reproductive output, survival, and fidelity to breeding sites.</p>		
Assess future changes to species status.	Monitor population status.	Incorporate species into multitaxa monitoring program.	Common Nighthawk Olive-sided Flycatcher

Target: Mesic Lower Montane Forest

In the Bitterroot Mountains, 32% of the land cover is classified as Mesic Lower Montane Forest. Within the Coeur d'Alene, St. Joe, North Bitterroot, and North Clearwater mountains, this habitat group is located on the slopes, valley bottoms, ravines, canyons, and benches with high soil moisture and cool summer temperatures. Elevation ranges from 487 to 805 m (1,598 to 2,641 ft). Commonly referred to as a cedar-hemlock forest, western redcedar and western hemlock (*Tsuga heterophylla* [Raf.] Sarg.) are common in the overstory with grand fir, Douglas-fir, Engelmann spruce (*Picea engelmannii* Parry ex Engelm.), western white pine (*Pinus monticola* Douglas ex D. Don), and western larch as frequent associates within the canopy (Cooper et al. 1991). The understory is composed of short and tall shrubs, perennial graminoids, forbs, ferns, and mosses, often at levels of in-stand diversity approaching or equal to the diversity found in some eastern deciduous forests (Reid 2013). In depressional areas with a high water table, devilsclub (*Oplopanax horridus* [Sm.] Miq.) is regularly encountered. Forests within this habitat group are often centuries old with fire only passing through every 500 years. The fire interval is long with stand-replacing fires occurring every 150 to 500 years and moderate fires every 50 to 100 years (Crawford 2011). Suppression of moderate fires in some locations has created mixed-aged stands that form fuel ladders, making the forest more susceptible to high-intensity and stand-replacing fires. Disturbance in the form of insect, disease, windfall, and ice generally produce canopy openings for the regeneration of forest types. Western white pine was once a predominant canopy species within this habitat group; however logging, fire, and the introduction of the white pine blister rust has reduced this species to below 90% of its historical prevalence (Cooper et al. 1991).

Target Viability

Fair. The structure and composition of some stands have been altered due to lack of natural fire cycle and loss of western white pine. Forest practices (e.g., even-aged management) has fragmented many stands.

Prioritized Threats and Strategies for Mesic Lower Montane Forest

Very High rated threats to Mesic Lower Montane Forest in the Bitterroot Mountains

Altered fire regimes (fire suppression & stand-replacing wildfires)

Historically, fires were as variable as the tree species in the forest stand, with an average mean interval of 200 to 250 years, but some stands burning with a mean of 18 years (Smith and Fischer 1997). Stands with fire intervals shorter than 140 years were often dominated by western white pine, western larch, and Douglas-fir (Smith and Fischer 1997). However, decades of fire suppression activities, aided by a cool period in the Pacific decadal oscillation, were effective in preventing most moderate-severity (and some stand-replacing) fires that enabled shade and fire-intolerant species to establish and heavy fuel loads to build (USFS 2013a). This resulted in the expansion of shade-tolerant species and a decrease in fire-tolerant species, alongside increases in vertical stand structure, canopy closure, vertical fuel ladders, fire intensity and severity, and insect and disease epidemics (Keane et al. 2002). Fire management activities over the past 15 years have attempted to simulate and reestablish the vegetative composition of regular fire patterns, but are hampered by policy that does not allow natural fires to burn. Additionally, population increases in neighboring towns has increased the WUI that often prevents the use of fire as a management tool.

Objective	Strategy	Action(s)	Target SGCNs
Restore a natural fire interval that promotes historical forest conditions (USFS 2013b [monitoring and evaluation program]).	Use prescribed and natural fires to maintain desired conditions (USFS 2015).	<p>Reduce fuels on lands within the WUI through mechanical removal or controlled burns (USFS 2015).</p> <p>Leave fire-killed trees standing (important wildlife habitat) if they pose no safety hazard (USFS 2015).</p> <p>Remove perceived barriers to allow more prescribed natural fire on state and private forest lands.</p> <p>Promote/facilitate the use of prescribed fire as a habitat restoration tool on both public and private lands where appropriate.</p> <p>Increase membership and participation in Idaho Forest Stewardship Programs, American Tree Farm System, and NRCS.</p>	<p>Olive-sided Flycatcher</p> <p>Townsend's Big-eared Bat</p> <p>Silver-haired Bat</p> <p>Hoary Bat</p> <p>Little Brown Myotis</p>
Simulate natural fire regimes.	Design and implement silvicultural prescriptions that simulate natural disturbance regimes.	<p>Actively remove shade-tolerant species.</p> <p>Increase markets to pay for ecological forest management activities, e.g., explore markets to thin trees so that they can ward off fire and insect threats.</p>	<p>Olive-sided Flycatcher</p> <p>Townsend's Big-eared Bat</p> <p>Silver-haired Bat</p> <p>Hoary Bat</p> <p>Little Brown Myotis</p>

High rated threats to Mesic Lower Montane Forest in the Bitterroot Mountains

Forest insect pests & diseases

When at endemic population levels, native forest insects and disease play a critical role in maintaining the health of the forest ecosystem by removing individuals or small groups weakened by drought, injury, or fire (USFS 2010). However, when large stands of trees are stressed by prolonged drought and/or dense stocking, outbreaks of forest insects and disease can impact tree growth, forest composition, and cause extensive tree mortality (USFS 2010). Severe outbreaks of forest insects and pathogens can even cause the conversion of forest to shrublands or grasslands. The impact on forest composition from large-scale outbreaks is predicted to increase as climate change decreases precipitation and increases temperatures (USFS 2010). Currently, 15–20% of lodgepole pine stands in the IPNF are at high risk for attack by the Mountain Pine Beetle (*Dendroctonus ponderosae*), whereas 25–30% of Douglas-fir stands are at high risk for attack by the Douglas-fir Beetle (*Dendroctonus pseudotsugae*), with each beetle predicted to kill 80% and 60%, respectively, of the basal area in high risk stands (USFS 2010). The introduction of the nonnative white pine blister rust has reduced western white pine to 5% of its original distribution across the interior Pacific Northwest. This caused changes in forest composition from a relatively stable, fire- and disease-tolerant western white pine forest to early-seral forests dominated by the fire- and disease-intolerant species such as Douglas-fir, grand fir, and subalpine fir (USFS 2013a).

Objective	Strategy	Action(s)	Target SGCNs
Reduce risk of stand-replacing pine beetle or root fungus infestations.	<p>Use integrative pest management strategies.</p> <p>Increase diversity of stand ages, size classes, and tree species (KPNZ Climate et al. 2010).</p> <p>Promote responsible firewood harvest/transport.</p>	<p>Use pheromones to protect stands (beetle whispering) (Kegley and Gibson 2004).</p> <p>Target removal of diseased and appropriate size class trees.</p> <p>Remove debris that attracts pine beetles.</p> <p>Cut out or girdle mistletoe-infected trees (IDL 2015).</p>	
Increase number of rust-resistant western white pine in the ecosystem (USFS 2013a).	<p>Continue to develop genetics of disease resistant trees.</p> <p>Plant rust-resistant western white pine during restoration efforts.</p>	<p>Conserve and protect any old-growth western white pine on the landscape. Determine if rust-resistant (Neuenschwander et al. 1999).</p> <p>Plant rust-resistant trees in openings that are <i>Ribes</i> free (Neuenschwander et al. 1999).</p> <p>Monitor and remove any signs of the rust on planted trees (USFS 2013a).</p>	<p>Olive-sided Flycatcher</p> <p>Townsend's Big-eared Bat</p> <p>Silver-haired Bat</p> <p>Hoary Bat</p> <p>Little Brown Myotis</p>

Species designation, planning & monitoring

Olive-sided Flycatcher is a SGCN found in the Mesic Lower Montane Forest that is declining as a result of unknown causes. The priorities for this species in the coming years are to identify and address the root causes.

Objective	Strategy	Action(s)	Target SGCNs
Determine causes of decline in Olive-sided Flycatcher.	Determine relative importance of known and suspected threats to Olive-sided Flycatcher, its prey, and its habitats (see Canada's recovery plan, Appendix B; Environment Canada 2015b). Investigate factors affecting reproductive output, survival, and fidelity to breeding sites.	Promote cooperation and collaboration with WWG PIF to fill knowledge gaps and to mitigate threats. Develop monitoring program to assess changes in species distribution and population size for SGCN and associated species.	Olive-sided Flycatcher

Target: Subalpine–High Montane Conifer Forest

At the higher elevations within the Coeur d'Alene, St. Joe, North Bitterroot, and North Clearwater mountains, the Subalpine–High Montane Conifer Forest is the prevalent habitat group and can be found at elevations between 900 and 2,373 m (2,953 to 7,785 ft). Engelmann spruce, lodgepole pine, and subalpine fir typically dominate the overstory. Mountain hemlock (*Tsuga mertensiana* [Bong.] Carrière) is often a coclimax species in this habitat group; however, like subalpine larch (*Larix lyallii* Parl.), it has a limited distribution in the St. Joe, North Bitterroot, and North Clearwater mountains (Smith and Fischer 1997). Douglas-fir, western larch, and western white pine (*Pinus monticola* Douglas ex D. Don) are found at the lower elevations on warmer sites. Thinleaf huckleberry (*Vaccinium membranaceum* Douglas ex Torr.) and grouse whortleberry (*Vaccinium scoparium* Leiberg ex Coville) are common species in the understory and provide important wildlife forage (Smith and Fischer 1997). Whitebark pine replaces lodgepole pine in higher elevations and becomes dominant as the elevation and climate severity increases. At timberline, the transition zone between continuous forest and the limited alpine, only Engelmann spruce, subalpine fir, subalpine larch, and whitebark pine persist. The timberline zone is impacted by drying winds, heavy snow accumulation, and subsurface rockiness that lead to stunted growth and a clustered distribution (Cooper et al. 1991, Smith and Fischer 1997). At timberline, whitebark pine is commonly the species that colonizes sites and provides habitat for less hardy species. Whitebark pine also provides food resources for numerous wildlife species such as Clark's Nutcracker and other small mammals and birds in the form of large high caloric-value seeds (Fryer 2002). It is a long-lived and slow-growing species that is often overtopped by faster-growing, shade-tolerant species such as subalpine fir and Engelmann spruce. Fire and other disturbances such as ice, windthrow, rockslides, and landslides help to maintain whitebark pine as the climax species within the upper elevations of the subalpine. However, fire suppression, invasion of white pine blister rust, and Mountain Pine Beetle have all contributed to the recent precipitous declines of whitebark pine across its range (Smith and Fischer 1997, Fryer 2002).

Target Viability

Poor to Fair. Stands are subject to altered fire regimes, forest insects, disease, and climate change. There has been a reduction in whitebark pine woodlands.

Prioritized Threats and Strategies for Subalpine–High Montane Conifer Forest

Very High rated threats to Subalpine–High Montane Conifer Forest

Altered fire regimes (fire suppression & stand-replacing wildfires)

Historically, mixed-severity fires burned at intervals between 60 and 300 years and nonlethal burns in the understory of whitebark pine stands at an average interval of 56 years (Smith and Fischer 1997). However, tree regeneration in the upper elevation is dependent on soil moisture, temperature, and whitebark pine seed cache and may be slow in some areas. The lack of whitebark pine regeneration after fire is thought to be due to a lack of seed cache after mature trees were killed by Mountain Pine Beetle or infected with blister rust (Smith and Fischer 1997). As with the other habitat types, decades of fire suppression activities, aided by a cool period in the Pacific decadal oscillation, were effective in preventing most moderate-severity fires that enabled shade-intolerant species and heavy fuel loads to build (USFS 2013a). This also resulted in the encroachment of shade-tolerant species and a decrease in fire-tolerant species, alongside increases in vertical stand structure, canopy closure, vertical fuel ladders, fire intensity and severity, and insect and disease epidemics (Keane et al. 2002). Fire management activities over the past 15 years have attempted to simulate and reestablish the vegetative composition of regular fire patterns, but have been hampered by policy that does not allow natural fires to burn.

Objective	Strategy	Action(s)	Target SGCNs
Restore a natural fire interval that promotes historical forest conditions (USFS 2013b [monitoring and evaluation program]).	Use prescribed and natural fires to maintain desired conditions (USFS et al. 2015).	<p>Reduce fuels through mechanical removal or controlled burns while minimizing impacts to subalpine soils.</p> <p>Leave fire-killed trees standing as wildlife habitat if they pose no safety hazard (USFS 2015).</p> <p>Remove perceived barriers to allow more prescribed natural fire on state and private forest lands.</p> <p>Promote/facilitate the use of prescribed fire as a habitat restoration tool, on both public and private lands where appropriate.</p>	Clark's Nutcracker Wolverine Mountain Goat Hoary Marmot
Simulate natural fire regimes.	Design and implement silvicultural prescriptions that simulate natural disturbance regimes.	Actively remove shade-tolerant species where impacts to fragile subalpine soils can be minimized.	Clark's Nutcracker Wolverine Mountain Goat Hoary Marmot

Objective	Strategy	Action(s)	Target SGCNs
Assess species response to changes in fire regimes.	Monitor species occurrence prior to and after fire events.	Incorporate species into multitaxa monitoring program.	Clark's Nutcracker Wolverine Mountain Goat Hoary Marmot

High rated threats to Subalpine–High Montane Conifer Forest in the Bitterroot Mountains

Climate change

Global climate change is expected to have widespread effects on temperature and precipitation regimes worldwide and mean annual global air temperatures are predicted to rise within the 2 to 4.5 °C range by the end of the century (Meehl et al. 2007). Conditions in the Pacific Northwest are expected to trend toward hotter drier summers and warmer wetter winters (Karl et al. 2009). Snowpack depth and duration are predicted to decrease, reducing summer soil moisture, impacting species dependent on mesic conditions. Climate change is expected to further alter fire extent and severity while allowing for larger-scale and more persistent Mountain Pine Beetle infestations. As a result, whitebark pine is expected to decrease in extent.

Delineating temperature refugia for cool water or air temperature dependent species is a relatively new idea (Isaak et al. 2015). Recent microclimate monitoring work in the Idaho Panhandle identified a portion of the St. Joe Mountains to have a cooler than average mean annual air temperature. In addition, the Coeur d'Alene Mountains tend to have warmer mean annual air temperatures than other mountain ranges in the Panhandle. Monitoring both the organisms that inhabit these mountains along with abiotic climate measurements will be an important component of adaptively managing wildlife in a changing climate (Lucid et al. 2016).

Objective	Strategy	Action(s)	Target SGCNs
Improve knowledge of species distribution.	Monitor climate variables and species co-occurrence over time.	Develop climate monitoring program using a variety of microclimate variables along with co-occurrence of associated SGCN.	Western Toad Clark's Nutcracker Wolverine Mountain Goat Hoary Marmot Pale Jumping-slug Magnum Mantleslug
Implement other state management plans.	Implement Management Plan for the Conservation of Wolverines in Idaho 2014–2019 (IDFG 2014).	Implement specific actions outlined in climate section of Management Plan for the Conservation of Wolverines in Idaho 2014–2019 (IDFG 2014).	Wolverine

Forest insect pests & disease

When at endemic population levels, native forest insects and disease play a critical role in maintaining the health of the forest ecosystem by removing individuals or small groups weakened by drought, injury, or fire (USFS 2010). However, when large stands of trees are stressed by prolonged drought and/or dense stocking, outbreaks of forest insects and disease can impact tree growth, forest composition and cause extensive tree mortality (USFS 2010).

Severe outbreaks of forest insects and pathogens can even cause the conversion of forest to shrublands or grasslands. The impact on forest composition from large-scale outbreaks is predicted to increase as climate change decreases precipitation and increases temperatures (USFS 2010). The introduction of the nonnative white pine blister rust has reduced whitebark pine by nearly a quarter to a half in subalpine ecosystems in northern Idaho and Montana (USFS 2010) by reducing the ability of the species to produce cones. In the Selkirk Mountains, an average of 70% of live whitebark pine is already infected by blister rust (Kegley and Gibson 2004). In addition, Mountain Pine Beetle often kills whitebark pines that are rust resistant (Schwandt 2006). As a keystone species within subalpine ecosystems, the loss of whitebark pine is predicted to negatively impact forest composition, wildlife communities, soil structure, and alpine hydrology (Schwandt 2006).

Objective	Strategy	Action(s)	Target SGCNs
Reduce risk of stand-replacing pine beetle infestations.	<p>Use integrative pest management strategies.</p> <p>Increase diversity of stand ages, size classes, and tree species (KPNZ Climate et al. 2010).</p> <p>Promote responsible firewood harvest/transport.</p>	<p>Use pheromones to protect stands (beetle whispering) (Kegley and Gibson 2004).</p> <p>Remove debris that attracts pine beetles.</p>	Clark's Nutcracker
Increase number of rust-resistant whitebark pine in the ecosystem (USFS 2013a).	Continue to develop genetics of disease-resistant trees for restoration efforts.	<p>Monitor rust and beetle levels in live whitebark pine. Collect rust-resistant seed for testing and restoration (Schwandt 2006).</p> <p>Plant rust-resistant whitebark pine.</p> <p>Monitor and remove any signs of the rust on planted trees (USFS 2013a).</p>	Clark's Nutcracker

Target: Riverine–Riparian Forest & Shrubland

In the Bitterroot Mountains, the riverine ecosystem includes all rivers, streams, and smaller order waterways (1st through 3rd-order; Strahler stream order) and their associated floodplain and riparian vegetation. Major rivers (those designated as 4th+ order in Strahler stream order) in the Bitterroot Mountains include the

Coeur d'Alene, Spokane, St. Joe, St. Maries, and North Fork Clearwater rivers. These low elevation riverine floodplains support riparian forests dominated by red alder, black cottonwood (*Populus balsamifera* L. subsp. *trichocarpa* [Torr. & A. Gray ex Hook.] Brayshaw), and western redcedar, as well as diverse shrublands characterized by thinleaf alder (*Alnus incana* [L.] Moench subsp. *tenuifolia* [Nutt.] Breitung), mallow ninebark (*Physocarpus malvaceus* [Greene] Kuntze), rose spirea (*Spiraea douglasii* Hook.),



St. Joe River © John Neider

redosier dogwood (*Cornus sericea* L.), willow (*Salix* L.), and other shrubs. Other rivers and streams in the region support numerous fisheries and provide host habitat for several mussel species. High-velocity mountain streams provide important nesting habitat for Harlequin Duck (*Histrionicus histrionicus*) and a diversity of aquatic invertebrates. Montane streams are typically lined by alder (*Alnus* Mill.), willow, or an array of other shrubs such as alderleaf buckthorn (*Rhamnus alnifolia* L'Hér.) with a diverse and lush herbaceous understory. The cold to very cold waters found in subalpine headwater systems support a diversity of stenographic invertebrates, particularly within the Northern Rocky Mountain Refugium. Engelmann spruce and subalpine fir commonly shade and provide large woody debris to these streams. In the Bitterroot Mountains, numerous waterfalls have been documented for the region. Waterfalls support aquatic organisms uniquely adapted to extremely high water velocities and plants and animals that require cool, constantly moist rocky habitats. Waterfalls also provide important nesting habitat for Black Swift (*Cypseloides niger*). At least 2 nesting colonies are known from the Coeur d'Alene Mountains (Miller et al. 2013).

Target Viability

Fair. A long history of mining, timber harvest, livestock grazing, and flood control has impacted many floodplains of major rivers and their low elevation tributaries. Higher-elevation streams are likely to be impacted by changes to the hydrologic regime resulting from climatic warming.

Prioritized Threats and Strategies for Riverine–Riparian Forest & Shrubland

High rated threats to Riverine–Riparian Forest & Shrubland in the Bitterroot Mountains

Pollution from mining

Heavy metal pollution, stream channelization, flood control, sedimentation, and migration barriers related to the extensive mining history have had severe impacts on fish, waterfowl, landbirds, amphibians, and aquatic invertebrates (Blus et al. 1995, Lybarger 2014, Maret and MacCoy 2002, Maret et al. 2003). In 1986, the US Environmental Protection Agency (EPA) listed the Bunker Hill Mining and Metallurgical Site in the Coeur d'Alene Basin on the National Priorities List. Remediation work began in 1989 to clean up contaminated sites particularly within inhabited locations. In 2002, a Record of Decision expanded remediation activities to areas outside of the Bunker Hill site. As sites are cleaned of contamination, restoration efforts have begun to restore the natural functioning ecosystem. Although restoration work has been completed in several areas since 2007, the final planning framework for the restoration of the Coeur d'Alene Basin is still in the approval process.

Objective	Strategy	Action(s)	Target SGCNs
Maintain (or provide) soil, sediment, and water quality capable of supporting a functional ecosystem for the aquatic and terrestrial plant and animal populations in the Coeur d'Alene Basin.	Restore river systems.	Implement the objectives, strategies, and actions outlined in the EPA's Bunker Hill and Metallurgical Site Record of Decision. Implement the objectives, strategies, and actions outlined in the Final Restoration Plan when approved.	Western Pearlshell

Aquatic invasive invertebrate & plant species

Aquatic invasive species are often the most difficult to detect and eradicate. Across the nation, Zebra Mussel (*Dreissena polymorpha*) and Quagga Mussel (*Dreissena bugensis*) have disrupted food chains, competed with native species, and cost millions of dollars of damage to municipalities by choking water intake pipes and other facilities (Pimental et al. 2004). Although neither Zebra nor Quagga Mussel have been detected in the waterbodies of the Bitterroot Mountains, several Watercraft Inspection Stations in the region have found the mussels on boats traveling through the area (State of Idaho Agriculture, accessed on Nov 2, 2015). It is a goal of the state that neither mussel is ever established in any of the Idaho waterways. Eurasian watermilfoil (*Myriophyllum spicatum* L.) has been detected and established in the Coeur d'Alene and St. Joe rivers (T. Woolf, pers. comm.). This species easily spreads through the movement of boats between the recreational lakes, rivers, and streams in the region. For most of the aquatic invasive species, only a fragment of the vegetated matter is necessary to establish the species in a new area. Aquatic invasive plant species, particularly Eurasian watermilfoil, often form dense mats that prevent the establishment of native aquatic plant species and

degrade wildlife and fish habitat (ID Invasive Species Counsel and ID State Dept. of Agriculture 2007).

Objective	Strategy	Action(s)	Target SGCNs
Prevent the establishment of aquatic invasive species in riverine systems.	Increase monitoring of riverine systems. Identify and treat dispersal vectors.	Determine which riverine systems are not impacted by aquatic invasive species. Establish a monitoring schedule to visit noninvaded but high-risk riverine systems. Educate the public about the dangers associated with spreading an aquatic invasive species (ID Invasive Species Counsel and ISDA 2007). Maintain Watercraft Inspection Stations to regularly inspect for aquatic invasive species and treat when detected.	
Contain and eradicate populations of Eurasian watermilfoil.	Implement actions indicated in the ISDA's 2008 Statewide Strategic Plan for Eurasian watermilfoil in Idaho.	Survey invaded waters to determine extent of nonnative aquatic species distribution. Develop treatment priorities based on waterbody use. Develop strategies for eradication based on waterbody hydrology and use. Regularly monitor and retreat areas after initial treatment (ID Invasive Species Counsel and ISDA 2007).	Western Pearlshell
Monitor threat.	Monitor changes in range and distribution of noxious weeds.	Incorporate noxious weeds into a multitaxa monitoring program.	Western Pearlshell

Species designation, planning & monitoring

In addition to conservation actions to address specific threats, several SGCN associated with Riverine–Riparian Forest & Shrubland require inventory and monitoring to assess their current status and distribution in the Bitterroot Mountains.

Harlequin Duck

In Idaho, the Harlequin Duck is uncommon and occupies high-quality streams from the Canadian border south to the Selway River and in the Greater Yellowstone Ecosystem. Breeding streams are relatively undisturbed with high-elevation gradients; cold, clear, and swift water; rocky substrates; and forested bank vegetation. Harlequin Duck uses different stream reaches over the course of the breeding season, depending on environmental conditions (e.g., timing and magnitude of stream runoff, food abundance) and reproductive chronology (i.e.,

prenesting, nesting, early and late brood-rearing), but remains closely tied to rivers and streams for food, security, and escape cover from predators. An estimated 50 pairs of Harlequin Duck breed in Idaho (IDFG unpublished data). From 1996 to 2007, no statistically significant change in the statewide population could be detected. However, possible declines exist on several rivers including the Moyie River, Granite Creek (Lake Pend Oreille drainage), and St. Joe River. The distribution and abundance of Harlequin Duck has not been assessed since 2007.

Objective	Strategy	Action(s)	Target SGCNs
<p>Improve understanding of Harlequin Duck distribution, abundance, and population status.</p>	<p>Design studies that improve understanding of the factors that influence Harlequin Duck stream occupancy, survival, and reproduction.</p>	<p>Mark and track individuals on the breeding grounds to better understand habitat use, survival rates, causes and timing of mortality, patterns and timing of movements, linkages between breeding, molting, and wintering areas, and return rates. Seek partnerships with coastal states and provinces to study wintering ecology and habitat use.</p> <p>Investigate how human disturbance, changes in forest management, and stream flow characteristics (severity, timing, and frequency of peak and low stream flows) affect behavior, occupancy, reproductive success, and survival on breeding streams.</p>	<p>Harlequin Duck</p>
<p>Establish baseline population metrics for Harlequin Duck.</p>	<p>Implement a coordinated Harlequin Duck monitoring program.</p>	<p>Develop partnerships, funding, and capacity to conduct breeding surveys statewide on a regular basis following the protocol established in the Harlequin Duck Conservation Assessment and Strategy for the US Rocky Mountains (Cassirer et al. 1996) or other appropriate techniques. Where local declines are documented, expand surveys upstream of historically occupied stream reaches.</p> <p>Coordinate surveys with MT, WY, OR, BC, and AB to facilitate a northwest regional population assessment.</p> <p>Incorporate Harlequin Duck surveys into riverine multitaxa monitoring programs.</p>	<p>Harlequin Duck</p>

Black Swift

Little is known about breeding Black Swift in Idaho. Black Swifts are not generally detected during breeding bird surveys. In addition, their cryptic nesting sites and small colony sizes present obstacles to determining distribution or abundance in the state. In 2013, a survey of breeding locations for Black Swift found evidence of nesting at 5 of 16 waterfalls visited and roosting swifts at 2 of the waterfalls (Miller et al. 2013).

Objective	Strategy	Action(s)	Target SGCNs
Determine current breeding locations of Black Swift.	Conduct a comprehensive survey of potential nesting locations.	Work with partners, including Intermountain Bird Observatory, to develop and implement a systematic survey. Incorporate surveys into multitaxa monitoring programs.	Black Swift

Aquatic Invertebrates

Basic knowledge of ecological requirements, habitat needs, systematics, and distribution is lacking for most aquatic invertebrates. Understanding distribution and habitat requirements for these species is critical for management and conservation, since most aquatic invertebrates have specific habitat requirements that generally do not overlap with aquatic vertebrates (Stagliano and Maxell 2010). Surveys in the Bitterroot Mountains, specifically within the Northern Rocky Mountain Refugium, identified a hot spot of invertebrate endemism, particularly within the cold headwaters (Stagliano and Maxell 2010). However, regardless of location, little is known about most aquatic invertebrates within this section.

Objective	Strategy	Action(s)	Target SGCNs
Determine distribution and habitat requirements of aquatic invertebrates.	Conduct surveys to determine distribution and trends. Investigate associations between species and abiotic factors.	Conduct surveys to determine distribution and trends. Collect voucher specimens to confirm identification and taxonomic status. Develop monitoring program to determine future changes in population size and species distribution. Design studies to determine microclimate requirements. Implement programs to monitor stream temperature and species occurrence.	Western Pearlshell Rotund Physa Rocky Mountain Dusksnail A Click Beetle (<i>Beckerus barri</i>) A Riffle Beetle (<i>Bryelmis idahoensis</i>) A Mayfly (<i>Ameletus tolae</i>) Lolo Mayfly A Mayfly (<i>Ephemerella alleni</i>) A Mayfly (<i>Paraleptophlebia falcata</i>) A Mayfly (<i>Parameletus columbiae</i>) Straight Snowfly Idaho Snowfly Palouse Snowfly Clearwater Roachfly Umatilla Willowfly A Caddisfly (<i>Manophylax annulatus</i>) A Caddisfly (<i>Eocosmoecus schmidii</i>) A Caddisfly (<i>Philocasca antennata</i>) A Caddisfly (<i>Philocasca banksi</i>) A Caddisfly (<i>Homophylax acutus</i>) A Caddisfly (<i>Rhyacophila oreia</i>) A Caddisfly (<i>Rhyacophila robusta</i>) A Caddisfly (<i>Goereilla baumanni</i>) A Caddisfly (<i>Sericostriata surdickae</i>)
Determine SGCN species status.	Conduct surveys and implement long-term aquatic invertebrate species monitoring program.	Develop program to monitor trends in species distribution and population size.	Western Pearlshell

Restoration tool: American Beaver

American Beaver populations currently exist at lower than historic levels across the western United States. This results in a host of ecological consequences, primarily located in lower-order stream systems such as stream downcutting, reduced riparian extent, and desiccation of riparian and wetland habitat. American Beaver restoration efforts have been shown to be an effective tool to restoring habitat and ecological function to riverine systems.

Objective	Strategy	Action(s)	Target SGCNs
Restore hydrologic function and restore riparian habitats.	Use American Beaver to accomplish hydrologic and habitat restoration.	<p>Determine past and current status of American Beaver populations.</p> <p>Determine feasibility of using American Beaver in restoration efforts.</p> <p>Implement actions delineated by above analysis.</p>	<p>Western Pearlshell A Mayfly (<i>Ephemerella alleni</i>)</p>

Target: Depressional Wetlands

Depressional Wetlands are any wetlands found in a topographic depression. Depressional Wetlands include vernal pools, old oxbows, disconnected river meanders, and constructed wetlands. In the Bitterroot Mountains, this includes many of the wetlands found within the Coeur d'Alene Wildlife

Management Area (WMA) and within the floodplains of the Coeur d'Alene, St. Joe, St. Maries, and North Fork Clearwater rivers. Other Depressional Wetlands are found within the mountain ranges wherever the topography closes and surface waters



Depressional Wetlands

accumulate (e.g., glacial carved kettles). Small depressional ponds (<2 m deep) commonly occur within the mountain ranges and provide breeding habitat for Western Toad (*Anaxyrus boreas*). Low-elevation Depressional Wetlands in the Bitterroot Mountains often support productive and diverse emergent marshes characterized by broadleaf cattail (*Typha latifolia* L.), hardstem bulrush (*Schoenoplectus acutus* [Muhl. ex Bigelow] Á. Löve & D. Löve var. *acutus*), woolgrass (*Scirpus cyperinus* [L.] Kunth), water plantain (*Alisma* L.), arrowhead (*Sagittaria* L.), bur-reed (*Sparganium* L.), water horsetail (*Equisetum fluviatile* L.), blister sedge (*Carex vesicaria* L.), and other species. Shrub swamps are also common, dominated by rose spirea, thinleaf alder, and other shrubs. In the valley bottoms, common reed (*Phragmites australis* [Cav.] Trin. ex Steud.) and reed canarygrass (*Phalaris arundinacea* L.) often form impenetrable monocultures that limit species diversity within the wetlands (K. Cousins, IDFG, pers. comm.). Amphibians, waterbirds, marshbirds, and waterfowl all use Depressional Wetlands for breeding and foraging habitats.

Target Viability

Fair. Lower elevations experiencing altered hydrologic regimes and invasive species/disease. Mining-related pollution also has a negative impact on wetland ecosystem health. Higher elevations threatened by climate change.

Prioritized Threats and Strategies for Depressional Wetlands

Very High rated threats to Depressional Wetlands in the Bitterroot Mountains

Invasive & noxious weeds

Invasive species often prevent the establishment of native species by forming dense monocultures and in some instances even change the soil chemistry or hydrology of the invaded area (Ricciardi et al. 2013). Common reed and reed canarygrass are native species in the lower 48 states, but aggressive nonnative strains introduced into Bitterroot Mountain wetlands are considered highly invasive. Reed canarygrass forms dense monocultures that decrease plant diversity and degrade wildlife habitat. Surveys done in the Bitterroot Mountains found 25 of the ponds, small lakes, and emergent wetlands ($n = 183$) surveyed had spotted knapweed or common tansy present (Lucid et al. 2016).

Objective	Strategy	Action(s)	Target SGCNs
Identify and eradicate any potential invasive species prior to establishment (USFS 2013a).	<p>Coordinate invasive and noxious weed monitoring and treatment across agencies.</p> <p>Implement the Idaho Invasive Species Council Strategic Plan.</p>	<p>Train agency staff to document presence/absence of noxious weeds during field/site visits.</p> <p>Develop a noxious weed database for all lands across Idaho. Use GPS, remote sensing, and GIS technologies to efficiently collect, store, retrieve, analyze, and display noxious weed information (ISDA 1999).</p> <p>Implement actions described in the 2012–2016 Idaho Invasive Species Strategic Plan (ISDA 2012).</p>	<p>Western Toad American Bittern Black Tern</p>
Contain and reduce widespread weeds in areas that are already infested (USFS 2013a).	<p>Coordinate invasive and noxious weed monitoring and treatment across agencies.</p> <p>Identify and treat dispersal vectors to prevent further spread of invasive and noxious weeds.</p> <p>Restore treated areas with native species.</p>	<p>Continue annual noxious weed control program and coordinate weed management activities with Kootenai County and the Inland Empire Cooperative Weed Management Area.</p> <p>Treat weeds in high impact areas and along roads (USFS 2013a).</p> <p>Treat equipment used during timber harvest or fire suppression activities to be “weed-free” (USFS 2013a, IDL 2015).</p> <p>Revegetate treatment areas with native species and monitor restoration (KTOI 2009).</p> <p>Implement actions described in the 2012–2016 Idaho Invasive Species Strategic Plan (ISDA 2012).</p>	<p>Western Toad American Bittern Black Tern</p>

High rated threats to Depressional Wetlands in the Bitterroot Mountains

Climate change

In the Pacific Northwest, climate change is expected to trend toward hotter, drier summers and warmer, slightly wetter winters (Karl et al. 2009). This scenario may result in snowpacks that are shallower and earlier melting. Although Depressional Wetlands may fill with water, it may occur earlier in the year. Less snowpack may mean less surface and groundwater being available to sustain wetland hydrology later in summer, resulting in more Depressional Wetlands drying out earlier in summer. How this will affect SGCN dependent on Depressional Wetlands is not known. More information is needed to make appropriate wetland management decisions needed to sustain wetland functions with a changing climate.

Objective	Strategy	Action(s)	Target SGCNs
Climate monitoring.	Monitor climate variables and species co-occurrence over time.	Develop climate monitoring program using a variety of microclimate variables along with co-occurrence of associated SGCN.	Western Toad American Bittern Black Tern

Species designation, planning & monitoring

Multiple species identified as SGCN that are dependent on Depressional Wetlands are declining as a result of unknown causes. The priority for many of these species in the coming years is to identify the root causes and develop a strategy for addressing them. For Black Tern, there may be many additional nesting sites in Idaho yet to be discovered. This should be a high priority in the next 10 years so that we have a better sense of our baseline breeding population.

Objective	Strategy	Action(s)	Target SGCNs
Determine reasons for decline in Western Toad population.	Conduct studies.	Conduct literature and discuss issue with experts. Implement measures to restore viable Western Toad populations.	Western Toad
Determine current distribution and abundance of American Bittern.	Participate in coordinated monitoring. Identify hot spots for conservation.	Conduct repeat surveys of effort initiated in early 2000s to determine where species distribution and density have changed.	American Bittern
Determine statewide breeding population of Black Tern.	Identify habitat requirements of breeding Black Tern.	Conduct repeat surveys of targeted habitat for Black Tern nesting.	Black Tern

Target: Springs & Groundwater-Dependent Wetlands

In the Bitterroot Mountains, Springs & Groundwater-Dependent Wetlands are numerous and often occur on sloping land with gradients ranging from steep hillsides to nearly imperceptible. Slope wetlands differ from Depressional Wetlands by the lack of closed contours. The mountainous region contains numerous wet-mesic meadows, fens, and seep-fed shrub or tree dominated wetlands. Wet meadows occur in alluvial valleys with high water tables and are typically dominated by sedge (*Carex* L.), tufted hairgrass (*Deschampsia cespitosa* [L.] P. Beauv.), and a variety of wildflowers. Fens are wetlands that have over 30 cm of peat accumulation, forming in cold and saturated sites. They also form as floating mats around ponds and lakes. Various sedges and sphagnum (*Sphagnum* L.) typify the vegetation in the Bitterroot Mountains. Coldwater springs are prevalent in the Bitterroot Mountains section, particularly in the subalpine headwaters of the North Fork Clearwater River, St. Joe River, and Coeur d'Alene River basins. As with fens, they often provide a coldwater refugium for invertebrate and vertebrate species (Issak et al. 2015).

Target Viability

Fair. Altered hydrologic regimes and invasive species/disease are problems at lower elevation springs and meadow wetlands. Higher elevation wetlands (especially fens) are threatened by climate change.

Prioritized Threats and Strategies for Springs & Groundwater-Dependent Wetlands

Very High rated threats to Springs & Groundwater-Dependent Wetlands in the Bitterroot Mountains

Invasive & noxious weeds

Invasive species often prevent the establishment of native species by forming dense monocultures and in some instances even change the soil chemistry or hydrology of the invaded area (Ricciardi et al. 2013). Reed canarygrass or other grass species introduced into meadows as forage for livestock can form dense monocultures that decrease plant diversity and degrade wildlife habitat.

Objective	Strategy	Action(s)	Target SGCNs
Identify and eradicate any potential invasive species prior to establishment (USFS 2013a).	Coordinate invasive and noxious weed monitoring and treatment across agencies. Implement the Idaho Invasive Species Council Strategic Plan.	Train agency staff to document presence/absence of noxious weeds during field/site visits. Develop a noxious weed database for all lands across Idaho. Use GPS, remote sensing, and GIS technologies to efficiently collect, store, retrieve, analyze, and display noxious weed information (ISDA 1999). Implement actions described in the 2012–2016 Idaho Invasive Species Strategic Plan (ISDA 2012).	Western Toad

Objective	Strategy	Action(s)	Target SGCNs
Contain and reduce widespread weeds in areas that are already infested (USFS 2013a).	<p>Coordinate invasive and noxious weed monitoring and treatment across agencies.</p> <p>Identify and treat dispersal vectors to prevent further spread of invasive and noxious weeds.</p> <p>Restore treated areas with native species.</p>	<p>Continue annual noxious weed control program and coordinate weed management activities with Kootenai County and the Inland Empire Cooperative Weed Management Area.</p> <p>Treat weeds in high impact areas and along roads (USFS 2013a).</p> <p>Revegetate treatment areas with native species and monitor restoration (KTOI 2009).</p> <p>Implement actions described in the 2012–2016 Idaho Invasive Species Strategic Plan (ISDA 2012).</p> <p>Incorporate noxious weeds into a multitaxa monitoring program.</p>	Western Toad

High rated threats to Springs & Groundwater-Dependent Wetlands in the Bitterroot Mountains

Climate change

In the Pacific Northwest, climate change is expected to trend toward hotter, drier summers and warmer, slightly wetter winters (Karl et al. 2009). This scenario may result in snowpacks that are shallower and earlier melting. Less snowpack may mean less groundwater being available to sustain hydrology later in summer, resulting in reduced wetland extent and conversion to drought-tolerant meadow communities. These changes will likely increase the temperature and evaporative rates in peatlands (e.g., cool microsite refugia), potentially reducing the value of these wetlands for species sensitive to warmer temperatures. Management that promotes retention of water in wetlands (e.g., American Beaver reintroduction) may be needed to mitigate hydrologic changes. How climate change will affect SGCN found in groundwater-dependent wetlands is uncertain. Although sometimes available, empirical data to evaluate even the basic climatic requirements for many species is generally lacking (Mawdsley 2009).

Delineating temperature refugia for cool water or air temperature dependent species is a relatively new idea (Isaak et al. 2015). Recent microclimate monitoring work in the Idaho Panhandle identified a portion of the St. Joe Mountains to have a cooler than average mean annual air temperature. In addition, the Coeur d'Alene Mountains tend to have warmer mean annual air temperatures than other mountain ranges in the Panhandle. Monitoring both the organisms that inhabit these mountains along with abiotic climate measurements will provide bedrock information for research to determine best management practices for cool air associated species.

Objective	Strategy	Action(s)	Target SGCNs
Climate monitoring.	Monitor climate variables and species co-occurrence over time.	Develop climate monitoring program using a variety of microclimate variables along with co-occurrence of associated SGCN.	Western Toad

Species designation, planning & monitoring

Basic knowledge of ecological requirements, habitat needs, systematics, and distribution is lacking for most aquatic and semiaquatic invertebrates within the Springs & Groundwater-Dependent Wetlands target. For example, the semiaquatic endemic click beetle (*Beckerus barri*) is known from only 2 locations and thought to be associated with groundwater-associated marshes. Understanding distribution and habitat requirements is critical for management and conservation since most aquatic invertebrates have specific habitat requirements that generally do not overlap with aquatic vertebrates (Stagliano and Maxell 2010).

Objective	Strategy	Action(s)	Target SGCNs
Determine distribution and habitat requirements.	Conduct surveys to determine distribution and trends.	<p>Conduct surveys to determine distribution and trends.</p> <p>Collect voucher specimens to confirm identification and taxonomic status.</p> <p>Develop monitoring program to determine future changes in population size and species distribution.</p>	<p>Rocky Mountain Dusksnail</p> <p>Pristine Pyrg</p> <p>A Click Beetle (<i>Beckerus barri</i>)</p> <p>Cascades Needlefly</p> <p>Idaho Forestfly</p> <p>Clearwater Roachfly</p>

Target: Pond-Breeding Amphibians

Amphibians represent a highly vulnerable taxonomic group that globally hosts more species in decline than birds or mammals (Stuart et al. 2004). Amphibian populations have been declining worldwide for decades (Houlahan 2000) and sometimes decline rapidly in seemingly pristine environments (Stuart et al. 2004). Amphibians are susceptible to pathogens, climate change, environmental pollution, ultraviolet-B exposure, and invasive species (Bridges and Semlitsch 2000, Cushman 2006, Kiesecker et al. 2001, Stuart et al. 2004); they also tend to have relatively low vagilities (Bowne and Bowers 2004, Cushman 2006) and often have narrow habitat requirements (Cushman 2006). Western Toad has experienced rangewide declines in western North America. A recent baseline survey effort in the Bitterroot Mountains Section detected this species at only 1 of 183 survey sites (Lucid et al. 2016); although trend cannot be inferred from this survey, the results nevertheless emphasize the need to conduct work to address this apparent population decline.

Target Viability

Poor. Amphibians represent a highly vulnerable taxonomic group. Western Toad is already facing rangewide declines and few were detected in the section. Western Toad faces invasive species/disease threats.

Prioritized Threats and Strategies for Pond-Breeding Amphibians

High rated threats to Pond-Breeding Amphibians in the Bitterroot Mountains

Amphibian chytridiomycosis & other disease

Recent surveys for amphibian chytridiomycosis, a disease caused by a fungal pathogen *Batrachochytrium dendrobatidis* [*Bd*], on Columbia Spotted Frog (*Rana luteiventris*) across the Bitterroot Mountains indicated the fungus is widespread, occurring at approximately 82% of surveyed sites. *Bd* was found more commonly at low and high elevation sites than mid-elevation sites. *Bd* is a known threat to Western Toad and has been documented to cause near total egg hatching failure of a Western Toad population in the Pacific Northwest (Blaustein et al. 1994). Further research is needed to assess the threat of *Bd* to Western Toad. Local die-offs of Western Toad and other herptiles have been recorded in recent years. These die-offs may be disease related and those sites should be investigated and monitored.

Objective	Strategy	Action(s)	Target SGCNs
Determine level of disease threat to Western Toad.	Determine status of <i>Bd</i> in Western Toad.	Visit known Western Toad sites and swab toads for <i>Bd</i> .	Western Toad
	Examine relationship of species occurrence, microclimate, and disease.	Collect microclimate variables at Western Toad sites and examine presence of <i>Bd</i> and other potential diseases.	
	Monitor amphibian disease.	Develop a monitoring program that encompasses monitoring <i>Bd</i> presence, <i>Bd</i> levels, and other potential amphibian disease.	

Species designation, planning & monitoring

The Western Toad is declining as a result of unknown causes. Priorities in the coming years are to identify and address the root causes.

Objective	Strategy	Action(s)	Target SGCNs
Determine causes of decline in Western Toad.	Determine relative importance of known and suspected threats to Western Toad, its prey, and its habitats.	Promote cooperation and collaboration with established wildlife diversity working groups to fill knowledge gaps and to mitigate threats.	Western Toad Northern Leopard Frog
	Investigate factors affecting reproductive output, survival, and fidelity to breeding sites.	Develop monitoring plan for Western Toad and other amphibians to determine distribution and population trends.	

Target: Lake-Nesting Birds

Western Grebe (*Aechmophorus occidentalis*) is a lake-nesting species that is found primarily on the lakes in the Coeur d'Alene WMA. Western Grebes build floating nests that are often hidden among emergent vegetation but are sometimes in the open. They are often found in colonies that can number into the hundreds or thousands. In the Coeur d'Alene WMA, a nesting colony of Western Grebe has been regularly documented on Cave Lake with nest numbers ranging from 20 to 80 nests per year. Lake-Nesting Birds are often impacted by recreational boat traffic and invasive and noxious weeds.

Target Viability

Good. The Cave Lake colony has consistently numbered between 20 and 80 nests. Occasionally, contains nesting Clark's Grebe (*Aechmophorus clarkii*).

High rated threats to Lake-Nesting Birds in the Bitterroot Mountains

Water level fluctuations in lakes

Fluctuating water levels are a significant issue for several waterbird species, including Western Grebe and Clark's Grebe. Most grebe colonies are located on lakes, reservoirs, or along rivers susceptible to water fluctuations resulting from dam operations. Rapid increase in water levels results in nest flooding, while rapid releases of water results in nests that are no longer accessible to grebes. In addition, recreational boat traffic near nests can inadvertently flood nests and cause a disruption of incubation behavior.

Objective	Strategy	Action(s)	Target SGCNs
Reduce grebe nest failure.	Work with US Army Corps of Engineers (USACE) and dam operators to reduce water level fluctuations and boat wake during grebe nesting period. Educate public regarding presence and sensitivity of colonial nesting birds.	Create boating no-wake zones around nesting colonies, and monitor their effectiveness. Develop Best Management Practices with USACE for water level management around grebe colonies. Create signage at boat launches informing the public of colony presence and recommendations for reducing recreational impacts.	Western Grebe

Species designation, planning & monitoring

Western Grebe is declining as a result of unknown causes. The priority for this species in the coming years is to identify and address the root causes.

Objective	Strategy	Action(s)	Target SGCNs
Determine causes of low nesting success and recruitment of Western Grebe in Idaho.	Conduct research on existing colonies in Idaho.	Collaborate with FWS on proposed research project.	Western Grebe

Target: Bat Assemblage

In the Bitterroot Mountains, 11 bat species are regularly documented on the landscape, including Townsend's Big-eared Bat (*Corynorhinus townsendii*), Silver-haired Bat (*Lasionycteris noctivagans*), Hoary Bat (*Lasiurus cinereus*), and Little Brown Myotis (*Myotis lucifugus*). Bats provide important ecological services through the regulation of forest and agricultural pests and nutrient cycling (USFS 2013a). However, little is known about population status and trends, migration routes, and hibernacula. In the Bitterroot Mountains, most bats are found foraging and roosting in most habitat types ranging from early-seral forest or clearcuts to mature- to late-successional forests (Hendricks and Maxwell 2005). Bats commonly forage along forest margins, above forest canopy, over water, and near the ground, generally preferring open stands or meadows to dense forests (Christy and West 1993). Bats roost in a variety of structures based on daily and seasonal needs ranging from trees and tree hollows to caves, mines, and anthropogenic structures (Hayes and Wiles 2013). All species are impacted by habitat loss and human disturbance at roost sites. The confirmation of white-nose syndrome (WNS) in Washington state in March 2016 elevates concern for the potential implications to Idaho's bat populations from WNS. Conservation efforts should focus on WNS response and disease surveillance, mitigating existing threats, and developing a statewide WNS response plan.

Target Viability

Fair. Roost locations are impacted by human disturbance and Abandoned Mine Lands (AML) closures. Models suggest white-nose syndrome could spread to Idaho in the near future.

Prioritized Threats and Strategies for Bat Assemblage

High rated threats to Bat Assemblage in the Bitterroot Mountains

Abandoned Mine Lands (AML) closures

As traditional roosting locations such as large snags are lost or altered, abandoned mines have become important habitat for numerous bat species (Ducummon 2000). Townsend's Big-eared Bat and Little Brown Myotis in particular often rely on caves and mines for roost locations. In the Bitterroot Mountains, caves are infrequent on the landscape; however, the long history of mining has left numerous abandoned mines with greater than 500 shafts, adits, and trenches identified in the IPNF and surrounding areas. In the 1980s and 1990s, thousands of mines were closed because of concerns to human safety with little forethought on the impact to roosting bats (Pierson et al. 1999). Closure of abandoned mines typically includes fencing, gating, and internal blasting to preclude humans from entering. Use of bat-friendly gates would prevent human entry while also protecting bat roosts.

Objective	Strategy	Action(s)	Target SGCNs
Reduce human disturbance at mines, tunnels, and tubes.	Promote the use of bat-friendly mine closures.	Survey mines to determine bat use and install the appropriate closures.	Townsend's Big-eared Bat Little Brown Myotis

White-nose syndrome

White-nose syndrome (WNS) is a fungal epidemic that has impacted bat populations in eastern North America, with the disease confirmed in Washington state in March 2016 (White-nose Syndrome.org). Although the fungus responsible for the infection (*Pseudogymnoascus destructans*) has been confirmed as pathogenic, the pathway by which the fungus causes mortality in bats is not well understood (Knudsen et al. 2013). The fungal infection appears to affect hibernating bats by increasing mid-winter arousal, aberrant behavior, and loss of fat reserves (Knudsen et al. 2013). Mortality associated with WNS has led to the near regional extirpation of several bat species in the East (Knudsen et al 2013).

Objective	Strategy	Action(s)	Target SGCNs
Minimize the potential spread of white-nose syndrome to north Idaho.	Implement WNS protection measures proactively.	<p>Require mandatory compliance to WNS decontamination standard operation procedures at mines, caves, or any other visited caverns.</p> <p>Work with USFS abandoned mine training program to ensure continued focus on education regarding WNS education and management.</p> <p>Participate in regional WNS monitoring efforts.</p> <p>Implement agency and public efforts to educate key individual in proper protocol when dead bats are detected.</p>	Townsend's Big-eared Bat Silver-haired Bat Little Brown Myotis

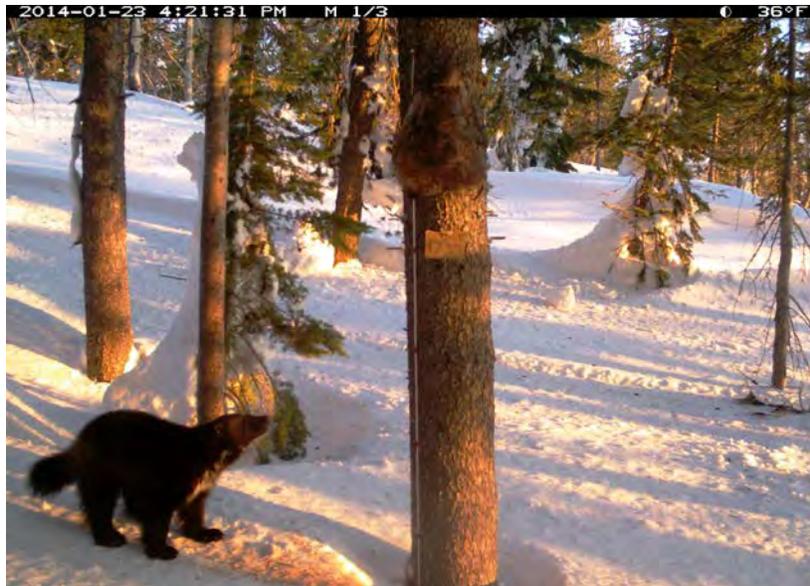
Species designation, planning & monitoring

Central to evaluating effectiveness of conservation actions will be programs to monitor changes in species distribution and abundance.

Objective	Strategy	Action(s)	Target SGCNs
Determine bat population status.	Conduct surveys and implement long-term bat monitoring program.	<p>Implement the North American Bat Monitoring Program (NABat) (Loeb et al. 2015).</p> <p>Implement and incorporate bats into long-term multitaxa monitoring programs to monitor trends in species distribution and population size.</p>	Townsend's Big-eared Bat Silver-haired Bat Hoary Bat Little Brown Myotis

Target: Low-Density Forest Carnivores

Forest carnivores naturally occur at low densities and can be directly affected by human activities. This presents unique opportunities to directly affect positive conservation outcomes for these species. This group consists of mammals traditionally considered “furbearers” including American Marten (*Martes americana*), weasels (*Mustela* spp.), and American Mink (*Vison vison*). Wolverine and Fisher are the 2 forest carnivore SGCN that occur within the Bitterroot Mountains Section. Recent surveys detected 2 individual male Wolverines within this section (Lucid et al. 2016).



Wolverine, 2014 IDFG

Fisher has been documented to occur across a large swath of northern Idaho including the Bitterroot Mountains. Fisher is naturally found at low densities, with males and females maintaining intrasexually exclusive home ranges that average approximately 104 km² and 52 km² (40 mi² and 20 mi²), respectively. Throughout its range, Fisher is associated with forested habitats with high canopy closure, complex vertical and horizontal structure, plentiful snags, and an abundant prey base (Proulx et al. 2005). Conservation efforts in this section should focus on maintaining or improving ecosystem integrity conducive to increasing the number and distribution of individual Wolverine and Fisher.

Target Viability

Poor to Fair. Only a few individual Wolverines are known to occur in the Bitterroot Mountains Section. Currently, Fisher is known to be distributed from the Idaho–Canada border south at least 300 mi to the area around Cascade, ID. No formal estimate exists for the number of Fishers in Idaho. As Fisher is associated with mature forest characteristics, timber management and harvest activities may impact its abundance and distribution. Lastly, Fishers are incidentally captured and killed during recreational trapping for other species. Between 2000 and 2005, 3 Fishers were incidentally captured and submitted to the Department for a reward (trappers are required to report all nontarget captures such as Fisher; a \$10 “reward” is offered for each report to encourage compliance with this regulation). Between 2010 and 2014, the most current data available, 54 were submitted for a reward (IDFG 2013, 2014). The causes and ramifications of this trend are poorly understood.

Prioritized Threats and Strategies for Low-Density Forest Carnivores

High rated threats to Low-Density Forest Carnivores in the Bitterroot Mountains

Timber management practices that remove overstory canopy from areas larger and more extensive than natural windthrow and fire

Even-aged timber management practices on moist productive sites (e.g., western redcedar, western hemlock, western white pine) on nonfederal industry and state-endowed lands that remove overstory canopy from areas larger and more extensive than natural windthrow and fire, and that result in inadequate amounts of late-seral forest retention results in degraded habitat quality for Fisher. For-profit timber companies do not manage for late-seral conditions except for Class 1 riparian areas, which represent about 5% of any forest type.

Objective	Strategy	Action(s)	Target SGCNs
Increase the amount of late-seral forested habitat with high canopy closure, complex vertical and horizontal structure, plentiful snags, and an abundant prey base.	<p>Identify optimal Fisher habitat needs and travel connectivity corridors.</p> <p>Promote timber management practices that create small patch cuts interspersed with large, connected, uncut areas.</p> <p>Use conservation easements to improve habitats.</p>	<p>Provide travel corridors where too steep to harvest, i.e., Stream Protection Zones.</p> <p>Continue fine-scale habitat studies that will facilitate integration of Fisher habitat requirements into timber harvest plans.</p> <p>Promote participation by timber company landowners in certification programs that demonstrate 95% compliance.</p> <p>Regularly review minutes from Idaho Forest Practices Act Advisory Committee (FPAAC).</p> <p>Promote participation in landowner incentive programs, e.g., IDFG, NRCS, American Tree Farm program, Idaho Forest Group, and Idaho Forest Stewardship Program.</p>	Fisher

Genetic isolation

Wolverine and Fisher were nearly or completely extirpated from the lower 48 states in the early 20th century. A variety of natural (Wolverine) and human-mitigated (Fisher) recolonization events have likely affected the genetic structure of the species' populations (Aubry et al. 2007, Vinkey et al. 2006). Populations of both species likely have low genetic diversity due to founder effects. Proper habitat management and gene flow mitigation may help to improve genetic isolation and increase species occurrence on the landscape.

Objective	Strategy	Action(s)	Target SGCNs
Assess and enhance gene flow.	Determine current levels of genetic isolation.	<p>Conduct genetic analyses to determine currently population sizes and levels of gene flow.</p> <p>Maintain transboundary collaborations to assess and monitor Wolverine gene flow with Canadian populations.</p>	Wolverine Fisher

Objective	Strategy	Action(s)	Target SGCNs
	Manage connectivity habitat and assess potential to enhance gene flow.	Implement actions outlined in the <i>Management Plan for the Conservation of Wolverines in Idaho 2014–2019</i> (IDFG 2014).	

Winter recreation

The *Management Plan for the Conservation of Wolverines in Idaho 2014–2019* (IDFG 2014) outlines specific actions to minimize potential disturbance of Wolverine by oversnow recreation and ski area infrastructure.

Objective	Strategy	Action(s)	Target SGCNs
Manage winter recreation to minimize disturbance.	Coordinate efforts between public and private entities.	Implement strategies outlined in the <i>Management Plan for the Conservation of Wolverines in Idaho 2014–2019</i> (IDFG 2014). Work with winter recreation groups to develop educational materials and programs.	Wolverine

Inadequate understanding of population and distribution status to assess potential effects of incidental capture from trapping on populations of Wolverine and Fisher

Wolverine and Fisher are on occasion incidentally captured in the course of trapping other species with legal harvest seasons. Idaho has a mandatory reporting requirement for incidental capture and mortality of any nontarget species such as Wolverine and Fisher. Based on IDFG records, some individuals are found dead in the trap, while others are released alive. Information gaps regarding ecology and population dynamics of these species limit ability to draw conclusions about whether incidental capture has any population effects (e.g., whether patterns in capture numbers reflect cyclic changes in populations, greater exposure to trapping, or population increase and expansion).

Objective	Strategy	Action(s)	Target SGCNs
Narrow information gaps about ecology and population dynamics to evaluate threats, including the potential effect of incidental capture to local populations of Wolverine and Fisher.	Gather the necessary information to understand conservation priority related to incidental capture.	Implement strategies and actions outlined in the <i>Management Plan for the Conservation of Wolverines in Idaho 2014–2019</i> (IDFG 2014) particularly Objective 6 (and related strategies): Continue to minimize injury and mortality of wolverines from incidental trapping and shooting. As part of educating trappers about techniques to minimize incidental capture, conduct interviews with trappers to obtain information about the condition and demographics of captured individuals, and the locations, habitats, and trap sets involved in incidental captures of Wolverine or Fisher.	Wolverine Fisher

Climate change

Delineating temperature refugia for cool water or air temperature dependent species is a relatively new idea (Isaak et al. 2015). Recent microclimate monitoring work in the Idaho Panhandle identified a portion of the St. Joe Mountains to have a cooler than average mean annual air temperature in the Panhandle. In addition, the Coeur d'Alene Mountains tend to have warmer mean annual air temperatures than other mountain ranges in the Panhandle. Monitoring both the organisms that inhabit these mountains along with abiotic climate measurements will be an important component to adaptively managing wildlife in a changing climate (Lucid et al. 2016).

Objective	Strategy	Action(s)	Target SGCNs
Climate monitoring.	Monitor climate variables and species co-occurrence over time.	Develop climate monitoring program using a variety of microclimate variables along with co-occurrence of associated SGCN.	Wolverine Fisher
Implement other state management plans.	Implement the <i>Management Plan for the Conservation of Wolverines in Idaho 2014–2019</i> (IDFG 2014).	Implement specific actions outlined in the climate section of the <i>Management Plan for the Conservation of Wolverines in Idaho 2014–2019</i> (IDFG 2014).	Wolverine

Species designation, planning & monitoring

Basic knowledge of current distribution for these species is well documented relative to other species. However, managing these species' needs in an adaptive capacity will require continued monitoring to determine changes in population levels, distribution, and gene flow. It is essential to build on current inventory programs and implement programs that allow continued monitoring work for these species.

Objective	Strategy	Action(s)	Target SGCNs
Monitor species population and distribution trends.	Expand knowledge of the distribution, abundance, and habitat requirements of Wolverine and Fisher.	Develop and participate in a multistate–provincial effort to monitor multiple carnivore species the US Northern Rockies. Develop a population estimate for Fisher. Conduct studies to determine why prey base for Fisher in the Coeur d'Alene Mountain Range is relatively less abundant than adjacent areas.	Wolverine Fisher

Target: Ground-Dwelling Invertebrates

Ground-Dwelling Invertebrates provide essential ecosystem services including decomposition, nutrient cycling, food for vertebrates, plant pollination, seed dispersal, and disease vectoring. They can also serve as effective indicators of environmental health (Jordan and Black 2012). This group encompasses a wide array of taxa. However, Bitterroot Mountains SGCN in this group are limited to terrestrial gastropods, Spur-throated Grasshoppers, and Harvestman species (commonly known as Daddy longlegs).



Cryptomastix sp. © Michael Lucid

Target Viability

Good. Habitat and threat data deficient. Many species taxonomically and distributionally data deficient.

Species designation, planning & monitoring

Basic knowledge of ecological requirements, habitat needs, systematics, and distribution is lacking for most Ground-Dwelling Invertebrates. Spur-throated Grasshoppers and Harvestman species are in need of basic taxonomic work. Although substantial knowledge of terrestrial gastropod distribution and microclimate requirements was obtained during work conducted from 2010 to 2014 (Lucid et al. 2016), much work remains to be done to gain an adequate understanding of basic conservation needs for these species. Four terrestrial gastropods are known to be associated with cooler than average mean annual air temperatures (Lucid et al. 2016). Managing microsites for these species for cool air temperatures and minimal disturbance is recommended until a better ecological understanding is developed through research and monitoring.

Objective	Strategy	Action(s)	Target SGCNs
Determine distribution and appropriate taxonomic status of several SGCN.	Investigate and validate taxonomic status.	Conduct field surveys to collect specimens. Conduct morphological and genetics work to determine species status.	Harvestman (<i>Acuclavella</i>) Species Group Pale Jumping-slug Marbled Jumping-slug Mission Creek Oregonian Coeur d'Alene Oregonian Kingston Oregonian

Objective	Strategy	Action(s)	Target SGCNs
			Spur-throated Grasshopper (<i>Melanoplus</i>) Species Group
Confirm site occupancy and protection for taildropper and axetail SGCN.	Conduct field investigation where species are known to occur.	Conduct genetics work to confirm taxonomic identity of specimens currently in possession of IDFG. Work with land management agencies or private landowners to minimize disturbance to sites.	Blue-gray Taildropper Papillose Taildropper Rocky Mountain Axetail
Develop a better understanding of distribution and habitat requirements for cool air temperature associated gastropods (Lucid et al. 2016).	Conduct research and monitoring.	Conduct surveys for gastropods and associated microclimate variables to assess environmental correlations. Manage forest structure near microsites to maintain cool air temperatures. Manage these sites for minimal disturbance. Implement long-term monitoring of species and habitat conditions.	Pale Jumping-slug Magnum Mantleslug Shiny Tightcoil
Determine population status of Ground-Dwelling Invertebrate SGCN.	Monitor populations.	Develop and implement multitaxa monitoring strategy for Ground-Dwelling Invertebrates.	Harvestman (<i>Acuclavella</i>) Species Group Pale Jumping-slug Marbled Jumping-slug Magnum Mantleslug Blue-gray Taildropper Papillose Taildropper Rocky Mountain Axetail Nimapuna Disc Salmon Coil Selway Forestsnail Mission Creek Oregonian Coeur d'Alene Oregonian Kingston Oregonian Shiny Tightcoil Spur-throated Grasshopper (<i>Melanoplus</i>) Species Group

Target: Pollinators

Pollinators provide an essential ecosystem service that benefits agricultural producers, agricultural consumers, and gardeners (Mader et al. 2011) in the Bitterroot Mountains. A wide range of taxa that includes birds and insects provide pollination activities. Two butterflies (Gillette's Checkerspot [*Euphydryas gillettii*] and Monarch [*Danaus plexippus*]) and 8 bee species compose the group of 10 SGCN pollinators known to occur within this section.

Many pollinators, especially bees, are known to be experiencing population declines throughout North America (Mader et al. 2011) and those declines may be occurring within the Bitterroot Mountains as well. Population declines and local die-offs occur for a variety of reasons including habitat loss, pesticide exposure, and climate change (Mader et al. 2011). The Bitterroot Mountains Section is ripe with opportunity to address these threats and increase the status of SGCN pollinators. Farmers, habitat managers, roadway authorities, municipalities, and homeowners can all contribute to pollinator conservation in clear and productive ways.



Western Bumble Bee

Target Viability

Fair. Many pollinators declining rangewide.

Prioritized Threats and Strategies for Pollinators

High rated threats to Pollinators in the Bitterroot Mountains

Pesticides

Pollinators are negatively affected by pesticides that are absorbed through the exoskeleton, ingested while drinking nectar containing pesticides, and carried back to colonies in pollen laced with pesticides (Mader et al. 2011). Neonicotinoids are particularly harmful to bee populations and can cause dramatic die-offs (Hopwood et al. 2012). Although the most effective pollinator benefitting strategy is to eliminate pesticide use, significant benefit for pollinators can still be achieved by reducing use and exposure (Mader et al. 2011).

Objective	Strategy	Action(s)	Target SGCNs
Reduce native pollinator	Educate habitat managers,	Conduct educational activities that encourage potential pesticide	A Miner Bee (<i>Andrena aculeata</i>)

Objective	Strategy	Action(s)	Target SGCNs
exposure to pesticides (Mader et al. 2011).	farmers, municipalities, and small property owners in methods to reduce pesticide use (Mader et al. 2011).	<p>applicators to eliminate use where practical. Where pesticides must be used, encourage applicators to apply the minimum amount of chemical necessary and apply when pollinators are least active (e.g., nighttime and when flowers are not blooming) (Mader et al. 2011).</p> <p>Specifically target urban homeowners in educational efforts to reduce use and properly apply pesticides (Mader et al. 2011).</p> <p>Conduct workshops that discuss pesticides in relation to other pollinator habitat management concerns (Mader et al. 2011).</p>	<p>A Miner Bee (<i>Perdita salicis euxantha</i>) Hunt's Bumble Bee Morrison's Bumble Bee Western Bumble Bee Suckley's Cuckoo Bumble Bee A Mason Bee (<i>Hoplitis orthognathus</i>) Monarch Gillette's Checkerspot</p>
Reduce native pollinator exposure to pesticides on IDFG administered property (Mader et al. 2011).	Implement measures to reduce or eliminate pesticide use on IDFG WMAs and other properties (Mader et al. 2011).	<p>Use the minimum recommended amount of pesticide (Mader et al. 2011).</p> <p>Apply pesticides at times when pollinators are least active such as nighttime, cool periods, low wind activity, and when flowers are not blooming (Mader et al. 2011).</p> <p>Mow or otherwise remove flowering weeds before applying pesticides (Mader et al. 2011).</p>	<p>A Miner Bee (<i>Andrena aculeata</i>) A Miner Bee (<i>Perdita salicis euxantha</i>) Hunt's Bumble Bee Morrison's Bumble Bee Western Bumble Bee Suckley's Cuckoo Bumble Bee A Mason Bee (<i>Hoplitis orthognathus</i>) Monarch Gillette's Checkerspot</p>
Eliminate use of neonicotinoid insecticides (Hopwood et al. 2012).	Education measures on the detrimental effects of neonicotinoids on bees (Hopwood et al. 2012).	<p>Develop and distribute educational materials to municipalities, counties, agricultural producers, habitat managers, and other property owners (Hopwood et al. 2012).</p> <p>Avoid use of neonicotinoids on IDFG administered lands (Hopwood et al. 2012).</p>	<p>A Miner Bee (<i>Andrena aculeata</i>) A Miner Bee (<i>Perdita salicis euxantha</i>) Hunt's Bumble Bee Morrison's Bumble Bee Western Bumble Bee Suckley's Cuckoo Bumble Bee A Mason Bee (<i>Hoplitis orthognathus</i>) Monarch Gillette's Checkerspot</p>

Habitat loss

Pollinators require foraging and nesting habitat. Providing both types of habitat within close proximity to each other is the best way to ensure pollinator success. Protecting, enhancing, and creating pollinator habitat can be a fun and rewarding way to engage with local communities. Educating land managers about techniques to reduce land management impacts to pollinators is an essential component to pollinator habitat management.

Objective	Strategy	Action(s)	Target SGCNs
Reduce impact of land management practices on pollinators (Mader et al. 2011).	Educate about and implement practices that benefit pollinators. (Mader et al. 2011).	<p>Reduce grazing impacts by limiting grazing to one-third to one-fourth of management areas per season (Mader et al. 2011).</p> <p>Implement pollinator beneficial mowing techniques including use of flushing bar, cutting at ≤8 mph, maintaining a high minimum cutting height of ≥12–16 in, mowing only in daylight hours, mow in a mosaic instead of an entire site (Mader et al. 2011).</p> <p>Where prescribed fire is used, implement pollinator-friendly burning protocols including rotational burning of ≤30% of each site every few years, leave small unburned patches intact, avoid burning too frequently (no more than every 5–10 years), avoid high-intensity fires unless the burn goal is tree removal.</p> <p>Work with Idaho Transportation Department to implement proper roadside pollinator habitat management (Mader et al. 2011).</p>	<p>A Miner Bee (<i>Andrena aculeata</i>)</p> <p>A Miner Bee (<i>Perdita salicis euxantha</i>)</p> <p>Hunt's Bumble Bee</p> <p>Morrison's Bumble Bee</p> <p>Western Bumble Bee</p> <p>Suckley's Cuckoo Bumble Bee</p> <p>A Mason Bee (<i>Hoplitis orthognathus</i>)</p> <p>Monarch</p> <p>Gillette's Checkerspot</p>
Conserve existing pollinator habitat.		<p>Map existing major known pollinator habitat. Identify and recognize landowners providing pollinator habitat and provide habitat management educational opportunity (Mader et al. 2011).</p> <p>Conduct surveys for native milkweed. Initiate seed saving program (Mader et al. 2011).</p>	<p>A Miner Bee (<i>Andrena aculeata</i>)</p> <p>A Miner Bee (<i>Perdita salicis euxantha</i>)</p> <p>Hunt's Bumble Bee</p> <p>Morrison's Bumble Bee</p> <p>Western Bumble Bee</p> <p>Suckley's Cuckoo Bumble Bee</p> <p>A Mason Bee (<i>Hoplitis orthognathus</i>)</p> <p>Monarch</p> <p>Gillette's Checkerspot</p>
Create new urban and rural pollinator habitat.	Develop programs to encourage urban landowners to create pollinator habitat.	<p>Provide pollinator habitat workshops for homeowners and rural land owners.</p> <p>Provide other educational materials for homeowners.</p> <p>Provide an incentive program for homeowners to create pollinator habitat in urban yards.</p> <p>Convert most lawns at IDFG office and housing locations to pollinator habitat.</p> <p>Work with municipalities and businesses to create urban pollinator habitat.</p> <p>Provide bee nest boxes for purchase at the Coeur d'Alene IDFG regional office.</p>	<p>A Miner Bee (<i>Andrena aculeata</i>)</p> <p>A Miner Bee (<i>Perdita salicis euxantha</i>)</p> <p>Hunt's Bumble Bee</p> <p>Morrison's Bumble Bee</p> <p>Western Bumble Bee</p> <p>Suckley's Cuckoo Bumble Bee</p> <p>A Mason Bee (<i>Hoplitis orthognathus</i>)</p> <p>Monarch</p> <p>Gillette's Checkerspot</p>

Species designation, planning & monitoring

Actions to enhance pollinator habitat will be most effective with knowledge of the current status of SGCN populations. Initiation of long term-monitoring will allow a continuous data stream to assess conservation activities. Gillette's Checkerspot occurs in locally abundant colonies (Williams et al. 1984). Specific surveys for this species are required to map distribution. Known occupied sites should be managed to minimize disturbance.

Objective	Strategy	Action(s)	Target SGCNs
Determine pollinator population status.	Conduct surveys and implement long-term pollinator monitoring program.	<p>Conduct surveys to identify colonies and breeding locations of bee SGCN.</p> <p>Conduct specific surveys for Gillette's Checkerspot.</p> <p>Protect known breeding sites.</p> <p>Develop program to monitor trends in species distribution and population size.</p>	<p>A Miner Bee (<i>Andrena aculeata</i>)</p> <p>A Miner Bee (<i>Perdita salicis euxantha</i>)</p> <p>Hunt's Bumble Bee</p> <p>Morrison's Bumble Bee</p> <p>Western Bumble Bee</p> <p>Suckley's Cuckoo Bumble Bee</p> <p>A Mason Bee (<i>Hoplitis orthognathus</i>)</p> <p>Monarch</p> <p>Gillette's Checkerspot</p>

Bitterroot Mountains Section Team

An initial summary version of the Bitterroot Mountains Section project plan was completed for the 2005 Idaho State Wildlife Action Plan. A small working group developed an initial draft of the Section Plan (Miradi v 0.14), which was then reviewed by a much wider group of stakeholders at a 2-day meeting held at the Idaho Department of Fish and Game in February 2015 (this input captured in Miradi v 0.16). This draft was then subsequently revised and has undergone additional internal view within the Idaho Department of Fish and Game. Materials in this document are based on Miradi v. 0.20. Individuals and organizations/agencies involved in this plan are shown in Table 3.3.

Table 3.3 Individuals, agencies, and organizations involved in developing this plan ^a

First name	Last name	Affiliation
Rita	Dixon*	Idaho Department of Fish and Game, Headquarters
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Michael	Lucid*	Idaho Department of Fish and Game, Panhandle Region
Matthew	Corsi	Idaho Department of Fish and Game, Clearwater Region
Joe	Dupont	Idaho Department of Fish and Game, Clearwater Region
Joel	Sauder	Idaho Department of Fish and Game, Clearwater Region
Wayne	Wakkinen	Idaho Department of Fish and Game, Panhandle Region
Tim	Weekley	Idaho Department of Fish and Game, Headquarters
Laura	Wolf	Idaho Department of Fish and Game, Panhandle Region
Gina	Davis	Idaho Department of Lands
Archie	Gray	Idaho Department of Lands
Robert "Bob"	Helmer	Idaho Department of Lands
Patrick E "Pat"	Seymour	Idaho Department of Lands
Dave	Stephenson	Idaho Department of Lands
Pete S	Van Sickle	Idaho Department of Lands
Charles R. "Chuck"	Peterson	Idaho State University
Kerry	Barnowe–Meyer	Nez Perce Tribe
Terrance W. "Terry"	Cundy	Potlatch Forest Holdings, Inc.
Russell L "Russ"	Davis	US Army Corps of Engineers
Lydia	Allen	US Forest Service Northern Region (R1), Idaho Panhandle National Forests

First name	Last name	Affiliation
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^a Apologies for any inadvertent omissions.

^b An asterisk "*" denotes team leader(s) and contact point if you would like to become involved in this work.